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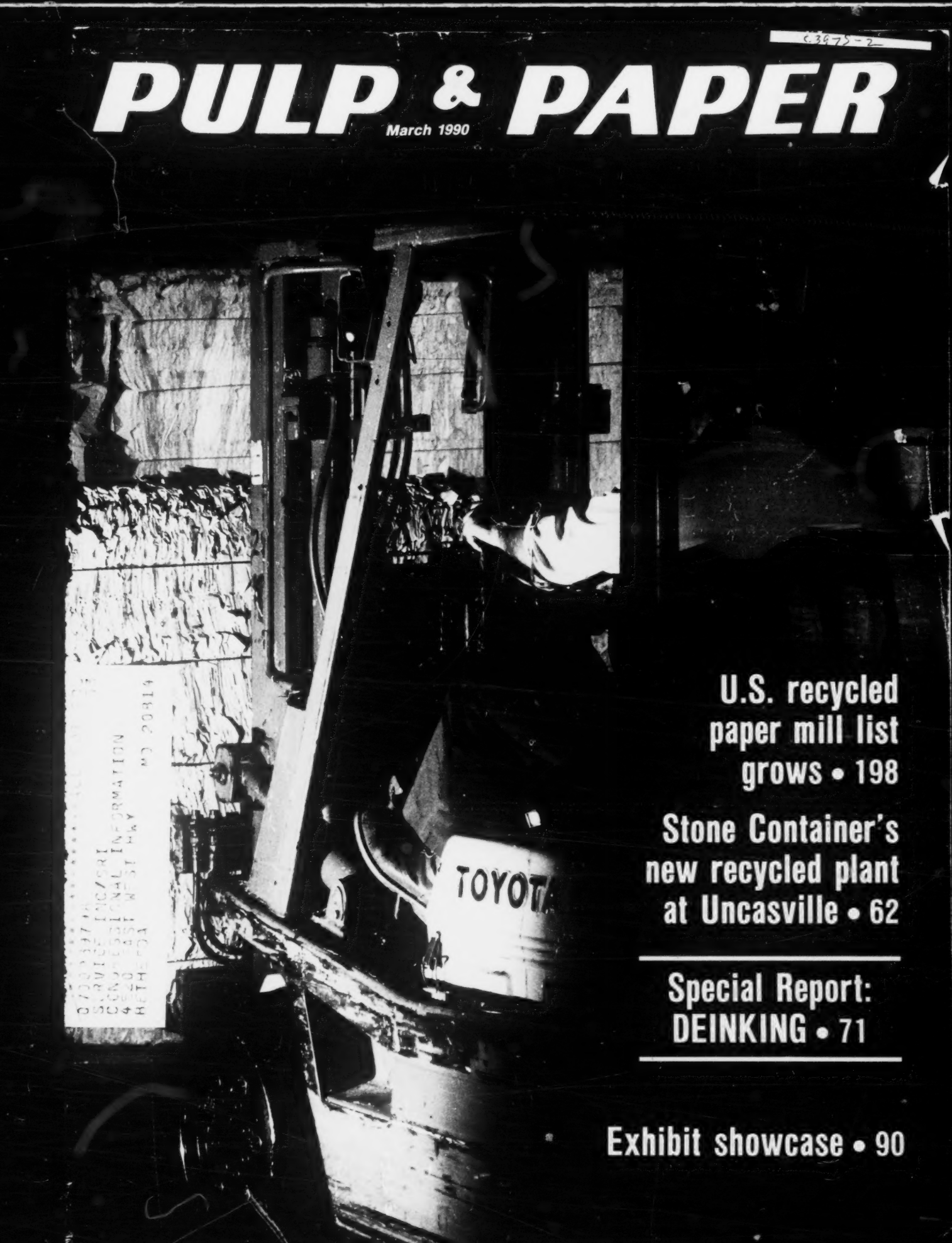
PULP & PAPER

March 1990



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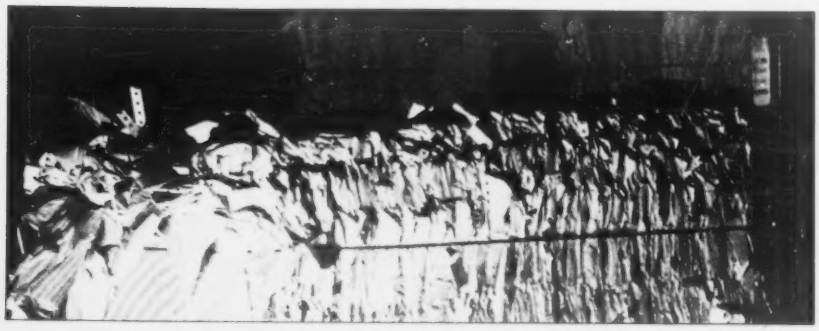

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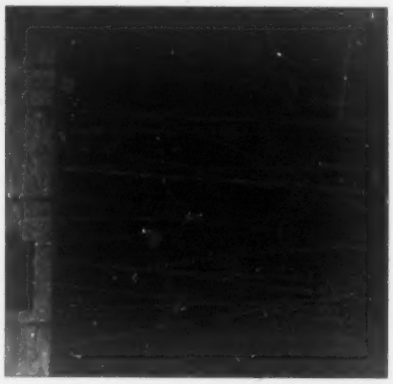

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PULP&PAPER

MARCH

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ABP

BPA

Coated free-sheet markets continue growth in high-end printing, publishing areas

Grade structure: Coated free-sheet contains 10% or less groundwood pulp, most commonly stone groundwood. The balance is chemical pulp. Highest-quality coated paper, Nos. 1 and 2, does not have any groundwood content, while Nos. 3 and 4 may or may not contain it. Slightly over half of all No. 4 paper is free-sheet.

Almost 86% of coated free-sheet paper is coated two-side (C2S). Most of the 420,000 tpy of coated one-side (C1S) paper is free-sheet.

Basis weights for premium coated Nos. 1 and 2 are usually between 60 lb and 100 lb; Nos. 3 and 4 generally are 25 to 90 lb. About 40% of coated Nos. 3 and 4 fall below 60 lb.

Gloss is the most popular surface finish (85%), followed by dull, matte, and embossed. As measured on the Garner glossmeter, finishes are 45 or more for glossy, down to 25 for dull, and 20 or below for matte. No. 1 is 65% glossy and 25% dull, with a fraction matte and embossed; No. 2 is about 80% glossy and 16% dull; and No. 3 is 63% glossy, 33% matte, and 3% dull. Embossed represents less than 2% of any grade.

Mills such as Consolidated Papers Inc., Potlatch Corp., and Westvaco Corp. have introduced new premium or super-premium No. 1 grades that have better reproduction qualities and higher prices.

No. 2 grades are similar to No. 1 but with slightly lower quality and a wider basis weight range. The grade will post some growth in "coffee table" type magazines and books, and, especially, advertising brochures.

The largest market for coated No. 3 is for catalogs, which consume nearly 50% of all U.S. shipments, plus magazines, books, inserts, and direct mail. Growth is expected to be excellent.

Production/capacity: Operating rates in 1988 were about 97%. U.S. coated free-sheet shipments rose to about 3.3 million tons, 8% above 1987.

Capacity increased about 7% in 1988. Additional tonnage was added by Midtec Paper Corp. in Kimberly, Wis., Westvaco in Luke, Md., and International Paper Co. at Corinth, N.Y. IP will add 100,000 tpy at Corinth in 1989.

Canadian mills that make coated free-sheet include Abitibi-Price Inc. and Fraser Inc. Island Paper Mills Co., Westminster, B.C., is planning to produce an unspecified amount of coated free-sheet with an off-machine coater by 1990, and Repap Enterprises Corp. will install a machine that can make either coated groundwood or free-sheet.

Outlook: Nos. 1, 2, and 3 grades will experience the strongest growth.

No. 1, about 5.5% of the coated market, will continue to undergo excellent growth.

Producers such as Consolidated Papers, Potlatch, and Westvaco have introduced new premium or super-premium No. 1 grades that possess better reproduction qualities and higher prices than the established No. 1 paper.

Shipments of coated No. 2 also will increase, bringing its share of the coated market close to 5%.

Growth for coated No. 3 will be 5.7% annually because it is produced mostly at integrated kraft mills, which have distinct cost advantages. For a minor price increase, end users can upgrade from No. 4, normally produced at mills that must purchase kraft pulp. And the trend continues for No. 4 free-sheet demand to increase faster than No. 4 groundwood.

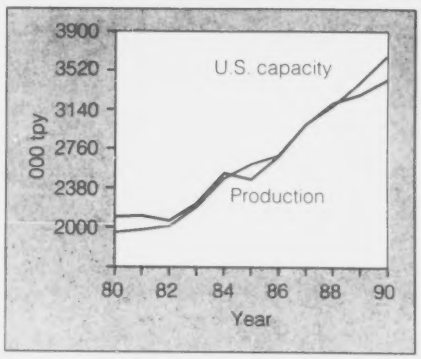
C1S paper, which is primarily used for labels, is forecast to grow at only 0.7% annually.

Markets: Commercial printers use most of the coated free-sheet paper. Major end users produce annual reports, catalogs, advertising and promotional materials, high-quality magazines, and books.

Prices: Coated free-sheet prices rose in July 1988, and producers were expected to try another price hike by March or April 1989 due to a strong marketplace.

Typical historic pricing trends ($/short ton, average price for year) are as follows for 70-lb No. 1 sheets: 1984, $1,321; 1985, $1,375; 1986, $1,350; 1987, $1,410; 1988, 1509. For No. 3 rolls: 1984, $919; 1985, $980; 1986, $945; 1987, $980; 1988, $1,115.

SUPPLY/DEMAND (000 tons)



FORECAST (000 tons)

	1988[3]	1989[3]	1990e
Production[1]	3,200	3,297	3,463
Capacity[2]	3,436	3,675	3,892
Utilization rate	93%	90%	89%
Imports[1]	125	127	135
Exports[1]	58	50	52
Apparent U.S. consumption	3,267	3,374	3,546
lb/capita	26.48	27.08	28.32
GNP ratio	1.62	1.63	1.68

e = estimate
1. *P&P* estimate
2. API
3. Revised

TOP NORTH AMERICAN PRODUCERS

	Annual capacity	Market share (%)
1. Scott Paper Co.	900	22.3
2. Westvaco Corp.[1]	580	14.3
3. Mead Corp.	380	9.4
4. Consolidated Paper Co.	330	8.2
5. Potlatch Corp.	300	7.4
6. Simpson Paper Co.	290	7.2
7. Champion Papers	285	7.1
8. Repap Enterprises Corp.	240	5.9
9. Noranda Forest Inc.	194	2.5
10. Abitibi-Price Inc.	102	2.5

Market share of top five companies:
68.8%

Market share of top ten companies:
89.1%

Total North american capacity/yr. (1990)
4,042

Canada (est.):
15,000 short tons

1. *P&P* estimate.

SALES AND EARNINGS

U.S. paper industry profits up 3.6% in 1989

Despite a decline in the final quarter, U.S. pulp and paper companies managed to boost earnings for the fourth consecutive year in 1989. The industry was able to report a 3.6% increase in profits on an 8.4% rise in sales, according to a *Pulp & Paper Week* survey of results from 24 companies. The increase is small, however, compared with jumps of 42% in 1988 and 46% in 1987. Chief executives warned of tougher times ahead in 1990 due to increasingly difficult market conditions for many pulp and paper grades. Flagging profit growth reflected soft market conditions for newsprint and printing/writing grades through most of last year.

Linerboard and market pulp began to weaken in fourth-quarter 1989, with tissue and boxboard among the few grade segments that still showed strength at the end. Industry profits were also helped by a strong performance from lumber and plywood operations, although mills in the Northwest were hurt by a sharp rise in woodchips costs.

Fourth-quarter 1989 earnings fell 4.4% from the final period of 1988, although sales were up 4.3%. Bad weather was also a major factor in fourth-quarter 1989, with a number of companies reporting mill curtailments due to the deep freeze in December over much of the eastern U.S. Hurricane Hugo and the San Francisco earthquake in October proved to be favorable to wood products shipments, although Hugo was responsible for driving up pulpwood costs in the southern U.S. as well. Georgia-Pacific Corp. posted a 41.5% increase in earnings to a record $661 million on a 7% increase in sales. Georgia-Pacific chairman and CEO T. Marshall Hahn Jr. attributed a nearly 49% increase in operating earnings from the company's pulp and paper operations to good progress in the tissue business, expansions, and the acquisition of Brunswick Pulp & Paper in 1988. Hahn also noted it was a good year for the building products segment. Georgia-Pacific is currently involved in a hostile takeover of Great Northern Nekoosa Corp., which it announced last November.

International Paper Co. reported its sixth consecutive year of earnings improvement with year-end profits of $864 million, up 14.6% on a 18.8% increase in sales. Fourth-quarter income was down 4.4% due to adverse weather and lower profits in the uncoated white paper business. The specialty business group continued to bolster performance in 1989, accounting for nearly 30% of the increase.

Printing/writing producers suffer. Printing/writing paper producers suffered from price discounting and a customer inventory adjustment that reduced shipments last year. Companies with newsprint mills were also hurt by a sharp erosion in prices caused by flat U.S. newsprint consumption and substantial new capacity additions in North America. Boise Cascade Corp.'s earnings fell 33% in the fourth quarter and 7.5% for the year. It said earnings were up sharply for its building products segment caused by construction work in the aftermath of Hugo and the California earthquake. But weak prices for many grades and higher chip prices in the Northwest hampered profits. Champion International Corp., a paper company with printing/writing paper and newsprint operations, saw its earnings decline 5.3% to $432 million with fourth-quarter profits down

U.S. paper/products results.

	Full year 1989 ($000)			
Companies	**Sales 1988**	**% Change**	**Earnings 1989[1]**	**% Change**
Boise Cascade Corp.	$4,338,030	5.9	$267,580	−7.5
Bowater Inc.	1,449,980	2.8	144,569	−12.0
Champion International	5,163,218	0.7	432,421	−5.3
Chesapeake Corp.	813,092	14.3	47,640	−7.5
Consolidated Papers Inc.	952,521	6.2	167,919	12.0
Federal Paper Board Co.	1,310,143	17.3	205,480	43.4
Gaylord Container (9/30)	746,000	11.1	39,400	−6.0
Georgia-Pacific Corp.	10,171,000	7.0	661,000	41.5
Great Northern Nekoosa	3,863,100	8.3	321,100	−6.0
International Paper Co.	11,400,000	18.8	864,000	14.6
Kimberly-Clark Corp.	5,733,600	6.3	423,800	11.9
Louisiana-Pacific Corp.	2,009,500	11.7	192,600	−35.7[2]
Mead Corp.	4,612,100	3.3	215,800	−38.8[2]
Mosinee Paper Corp.	233,114	0.5	6,651	−29.8[2]
Pope & Talbot Inc.	618,758	20.2	43,637[2]	36.6
Potlatch Corp.	1,227,622	13.2	136,715	21.7
Scott Paper Co.	5,065,600	7.2	375,500	−6.3
Sonoco Products Co.	1,655,830	3.5	103,561	7.6
Temple-Inland	1,894,200	6.8	207,400	4.1
Union Camp Corp.	2,761,337	3.8	299,400	1.4
Wausau Paper Mills Co. (9/31)	317,097	11.6	20,912	30.7
Westvaco Corp. (10/31)	2,327,576	8.4	223,090	11.3
Weyerhaeuser Paper Co.	10,105,610	8.3	601,407	6.3
Willamette Paper Co.	1,891,824	10.2	191,056	18.6
Total	**$80,660,852**	**8.4%**	**$6,192,638**	**3.6%**

1. Income after taxes, from continuing operations, excluding most significant nonrecurring items in both years.
2. **Louisiana-Pacific:** Reflects 1988 gain on final settlement of Redwood National Park condemnation. **Mead:** Includes $11,200,000 gain in sale of businesses in 1988. Year total reflects gain of $112,100,000 in 1988 relates to sale fo businesses. **Mosinee Paper:** Includes charges of $11,300,000 primarily from restructuring costs. **Pope & Talbot:** Includes a $5,555,000 gain on sale of sawmill. **Westvaco:** Fourth quarter earnings in 1989 were reduced by $0.05/share due to the impact of Hurricane Hugo.

14.1%. Mead Corp. reported earnings of $216 million, down from $364 million in 1988. The company said that fourth-quarter earnings were affected by softening demand for its uncoated paper grades, a slow startup following downtime at its Northwood pulp affiliate, and costs associated with ramping up its new Cycolor products and coated boxboard machine. Consolidated Papers Inc. showed sales and earning at record levels for the second consecutive year, however. The company reported strong demand for heavier weight coated paper, price improvements, and increased kraft pulp production that lifted earnings 12% from year-earlier levels.

Paperboard results mixed. Profits of companies heavily involved in paperboard production were mixed. Profit margins of containerboard producers were under pressure from lack of a price increase, but boxboard suppliers were able to raise prices and achieve higher profitability. Federal Paper Board Co., for example, increased its earnings 43.4% to $205 million due to strength in both its boxboard and market pulp operations, although fourth-quarter earning results were flat. On the other hand, Union Camp Corp. said softening of linerboard prices, discounting in uncoated paper, and severe weather that disrupted operations at three of four mills were behind a 20.7% fourth-quarter drop in earnings. The company reported net income of $299 million, up 1.4% from 1988.

Tissue market improving. Kimberly-Clark Corp. overcame troublesome conditions in the North American pulp and newsprint business with a 12% increase in profits. Strong operating results were registered by K-C's personal care and household consumer products businesses. Fourth-quarter profits were up 16.8%. Despite what he called "an outstanding performance" from its tissue business, Scott Paper Co.'s chairman and CEO Philip E. Lippincott said financial results in 1989 were "disappointing." Scott saw profits drop 6.3% to $375.5 million on a 7.2% increase in sales. Lippincott noted "significant manufacturing difficulties" in the company's printing and publishing paper operations as the reason for the decline. Fourth-quarter earnings tumbled 11.5%. Chesapeake Corp. cited expenses associated with its tissue expansion and new consumer products company as reasons for a 33% fourth-quarter decline in profits and a 7.5% annual drop from 1988.

Weyco takes big charge. Weyerhaeuser Co. took a $497 million pretax charge for a restructuring program, resulting in a $128.7 million net loss for the fourth quarter. The charge reduced the company's full-year earnings by 40% to $341.1 million. However, before the charge, the company's earnings of $601 million were up 6.2% from 1988. ■

RECYCLED NEWSPRINT

Canadian companies delay recycling projects

Several paper companies in Canada have announced that they are postponing plans to incorporate recycled fiber at some of their mills, and some of these may not go ahead if federal or provincial funding is not offered. However, the U.S. paper industry appears to be committed to increasing recycled paper and paperboard production capacity, according to Red Cavaney, president of the American Paper Institute.

In testimony before the U.S. Congress recently, Cavaney said, "Over the next three years, consumption of wastepaper in domestic paper mills will grow at a rate twice as fast as that of virgin fiber." However, he cautioned legislators not to tax virgin-fiber products, as it could spur growth too quickly. "Industry demand for wastepaper is projected to increase dramatically through the decade, and for some paper grades, that demand could well approach what is considered the maximum amount that can be collected," noted Cavaney. Meanwhile, the American Newspaper Publishers Assn. has encouraged Congress to promote newspaper recycling.

Wastepaper shortages expected. In Canada, too, there is growing concern that recycled projects may be built quicker than the supply of wastepaper can be generated. At the Canadian Pulp & Paper Assn.'s annual meeting late in January, CPPA president Howard Hart projected a shortage of old newspapers (ONP) in Canada by the end of this year.

Canadian companies are also more skeptical than U.S. companies about the long-term benefits of investing in recycled fiber equipment. Not only do possible secondary fiber shortages concern them but also wastepaper may not be feasible for those that are remote from metropolitan areas. They are starting to ask local and federal agencies for assurances of their commitment to recycling and for financial assistance.

Kruger Inc. said it would build a C$53-million deinking plant adjacent to its newsprint mill in Brompton-ville, Que., only if assured of government support. Cascades Inc. said it delayed its own recycled business paper mill project, but it could be back on track as early as this month.

Cascades has been looking at several locations for a joint venture with Steinbeis & Consortium GmbH (*P & P*, Nov. 1989, p. 39). Using the Fed. Rep. Germany company's technology, a 100,000-metric-tpy recycled computer printout and copier paper mill would use 100% ONP. Depending on where the mill is built, it could cost from C$40 to C$150 million.

Cascades thought it would have made its decision by late January. The sites considered included Niagara Falls, N.Y., Montreal, Que., East Angus, Que., and Cap de la Madaleine, Que. New York State, meanwhile, is trying to sway Cascades toward Niagara Falls. The company has met twice with local and state officials, who have outlined an economic incentive package, according to local reports.

Meanwhile, in Quebec City, Que., late in January, Forestry Minister Albert Cot said a new program to encourage mills to use ONP and old magazines would be submitted for cabinet approval within three to four weeks. This could include financial aid for new deinking plants. To qualify, deinking plants would have to draw at least 50% of their raw materials from Quebec. The province's Forestry Act may also be amended to require greater use of not only wastepaper but also woodchips to conserve dwindling forests.

In Alberta, the province's Liberal environmental critic Grant Mitchell criticized the provincial government for attracting kraft pulp mills to the province while the North American trend is toward recycling, according to the *Toronto Globe & Mail*. Alberta

Newsprint Co. president Ron Stern said recently that deinking equipment would be added to the new mill, which is scheduled to start up this summer, if sales are at risk. However, 60 to 65% of the mill's output will be exported. MacMillan Bloedel Ltd. is the sales agent.

CPPA's agenda includes recycling. CPPA's Hart noted in late January that even if six out of ten old newspapers in Ontario, or an estimated 340,000 tons, were to be collected for recycling, there would still be a shortage. Canadian mills would be forced to import the rest. CPPA has transferred recycling from its environmental agenda to its economic agenda, noted John Houghton, president of Quebec & Ontario Paper Co. Ltd., the only producer of recycled newsprint in Canada. Q&O recently began testing recycled newsprint made from 100% ONP. Previously, the stock had contained 55% ONP. The company said it would see how the paper ran on its customers' presses and would wait awhile before it began making 100% recycled newsprint on a regular basis. ■

North American recycled newsprint projects, 1989-91 (announced).

Company	Mill/location	Capacity (metric tons)	Startup	Recycled content (%)
Southeast Paper	Dublin, Ga.	215,000[1]	1989	95-100%
Atlantic Packaging Corp.	Whitby, Ont.	136,100[1]	1990	100
Augusta Newsprint Co.	Augusta, Ga.	90,000[2]	1990	25-40+
North Pacific Paper Corp.	Longview, Wash.	230,000[2]	1991	25-40+
Canadian Pacific Forest Products Ltd.	Thunder Bay, Ont.	100,000[2]	1991	40+
	Gatineau, Que.	182,500[2]	1991	40+
Proposed				
Bowater Inc.	Calhoun, Tenn.	132,500[2]	1991	n.a.
MacMillan Bloedel Inc.	Port Alberni, B.C.	n.a.[2]	n.a.	n.a.
	Powell River, B.C.	n.a.[2]	n.a.	n.a.
Fletcher Challenge Ltd.	Crofton, B.C.	n.a.[2]	n.a.	n.a.
	Elk Falls B.C.	n.a.[2]	n.a.	n.a.
Kruger Inc.	Bromptonville, Que.	n.a.[2]	n.a.	n.a.
Garden State Paper Co.	Northeast U.S.	n.a.[1]	n.a.	100
Smurfit Newsprint Corp.	Northeast U.S.	255,000[1]	n.a.	50+
	Newberg, Ore.	275,000[1]	n.a.	50+
Balaclava Enterprises	Vancouver, B.C.	122,500[2]	1991	n.a.
Great Northern Paper Co.	E. Millinocket, Maine	250,000[2]	n.a.	40
Donahue Inc.	Clermont, Que.	n.a.[2]	n.a.	n.a.
Bear Island Paper Co.	Ashland, Va.	n.a.[2]	n.a.	n.a.
Atlantic Packaging Corp.	Whitby, Ont.	n.a.[1]	n.a.	100

1. New paper machines.
2. Deinking to be added to existing mills (except Balaclava's market deinked pulp mill).

Atlantic Packaging delays Whitby startups

Atlantic Packaging Products Ltd. announced that wastewater treatment plans have delayed startups for recycled tissue and newsprint machines at the Whitby, Ont., mill.

Meanwhile, it was learned that Kruger Inc. has also pushed back the projected startup of its 180,000-metric-tpy newsprint machine at its Trois Rivières, Que., mill until later this year or early in 1991. It was previously expected to come onstream in the third quarter, and, initially, No. 10 was to start up in late 1989.

At Atlantic Packaging's Whitby mill, a two-phase project had scheduled startup of a 32,000-tpy tissue machine for early 1989, but the machine is just now coming onstream. The second phase of the project, a 134,500-tpy newsprint machine, will not come online until late this year. The mill is designed to accommodate a second newsprint machine and additional capacity for tissue or containerboard. The company uses both washing and flotation in its deinking system at Whitby. The two-process system is the new trend in deinking as it processes both ONP and coated magazine paper and produces fiber with beneficial characteristics. ■

More states adopt recycled newsprint laws

Several states in the U.S. have been added to the roll of those seeking legislative remedies for a glut of old newspapers (ONP). However, some states have begun to negotiate settlements outside the law, with publishers agreeing voluntarily to increase consumption of recycled newsprint.

Maryland, Vermont, Missouri, and South Dakota are among states that have moved toward some type of mandatory recycled newsprint consumption law over the past months. New York, New Jersey, New Hampshire, and Pennsylvania, however, are working on voluntary guidelines.

In January, the New York Newspaper Publishers Assn. accepted recommendations from a New York State newspaper recycling task force calling for voluntarily increasing recycled newsprint consumption from 7% to 40% by the year 2000.

New York's voluntary agreement. The task force's proposal also includes steps to attract a recycled newsprint mill to the state. Several newsprint manufacturers reportedly have expressed interest in such a project. The state Economic Development Dept. would develop an incentive package for such a project and appoint a manager to handle environmental permits and other details.

In Pennsylvania, newspaper publishers reportedly agreed to use at least 50% recycled newsprint by 1995. The Scripps-Howard newspapers said they would quadruple use of recycled newsprint in 1990, and others have made similar statements.

In Wisconsin late last year, the Wisconsin Newspaper Assn. reached an agreement with state legislators on a recycled newsprint bill filed last fall. WNA was able to negotiate voluntary guidelines in the pending legislation as well as decrease the percentages of recycled newsprint consumption required and extend the deadlines for compliance.

Recycled pulp content in newsprint consumed in the state would go from a 5% requirement in 1991 to 20% in 2001 (see table on p. 31). Also, publishers would be exempt from compliance if recycled newsprint is not available in the quantity, of the quality, or at the price comparable to virgin-fiber newsprint.

Maryland proposal unique. A bill was prefiled in early January in

Maryland with a new twist on the trend these recycling laws have taken. It sets mandatory consumption goals at 20% in 1992, moving up to 40% by 1994. However, publishers would be exempt from these goals if they forego their sales tax exemption.

"It's one of the most skillfully crafted bills I've ever seen," noted Kevin Grant, of the American Newspaper Publishers Assn. "It's putting heat not only on the production side of it, but on the consumption side too. The state has something the publishers want and they have something the state wants."

U.S. recycled newsprint legislation.

State laws	Fees or credits[1]	Consumption[2] goal	timetable	Status
California	Penalties not to exceed $1,000/violation	25%	1/1/91	Passed
Connecticut		20%	1993	Passed
Florida	10c/ton tax until 10/92; 50c/ton if goal not reached	50%	1992	Passed
Illinois	10c/ton tax; penalties not to exceed $5,000/violation	10% 50%	1992 1998	Pending
Louisiana	10c/ton tax			Failed
Maryland	$30/ton credit on recycled newsprint consumed over goal	20% 40%	1992[3] 1994	Pre-filed
Massachusetts	$56/ton credit on recycled newsprint			Pending
Missouri	H.B. 949 10% of the cost/ton of Virgin newsprint consumed	10% 50%	1992 1996	Pending
	S.B. 513	10% 50%	1993 1997	Filed
Nebraska	$1/ton tax			Failed
New Jersey	A.B. 4809	45% 90%	1990[4] 1992	Pending
	A.B. 4703	45% 90%	1989 1991	Pending
New York	Paper not meeting requirement not to be sold in state		1991[4]	Failed
N. Carolina	10c/ton tax			Failed
Oregon	$1/ton tax			Failed
Rhode Island	$11/ton tax by 1991; $56/ton by 1994			Pending
S. Dakota	10%/ton cost of virgin newsprint used short of goal	10% 50%	1992 1996	Drafted
Vermont		25%	1991	Pre filed
Virginia	10c/ton tax			Failed
Wisconsin	$500 maximum penalty for not reporting	5% 20%	1991[5] 2003	Pending
Federal laws:				
S.B. 1763	Credits for excess recycled newsprint made is transferable	10% 30%	1990 2000	Pending
S.B. 1764	Credits for excess recycled newsprint used is transferable	15% 40%	1992 2000	Pending

Does not include preference purchasing provisions for government agencies. Includes states where legislation is most advanced.

1. Fees are generally taxes or penalties on virgin-fiber newsprint consumed. Credits generally apply to recycled-fiber newsprint used, and are usually used to offset taxes/penalties.
2. Applies to amount of total consumption that must be recycled-fiber based, unless otherwise noted. Ranges imply goals to be phased-in between these dates.
3. Goals are aggregate of recycled fiber consumed in proportion to total newsprint consumed by individual publisher.
4. State task force has proposed voluntary guidelines. (New York's proposal is to increase recycled newsprint consumption gradually from 7% in 1990 to 40% by 2000.)
5. Goals are aggregate of statewide recycled fiber consumed in proportion to total newsprint consumed. Compromise reached late in 1989 proposes to make all consumption goals voluntary and only applicable when recycled-fiber newsprint is available in the quantity, at the quality, and of competitive price to virgin-fiber newsprint.

Source: American Newspaper Publishers Assn.

Complex formula in Missouri. In Missouri, the state senate and assembly each have a bill pending. House bill 949 calls for mandatory recycled newsprint consumption to start at 10% in 1992 and move up to 50% by 1996. Penalty for noncompliance is based on a complicated formula, which is as follows: 10% of the cost of the virgin newsprint consumed that year is multiplied by the recycling target, and from that figure the actual recycled newsprint consumed is deducted. Missouri senate bill 513 starts with a goal of 10% in 1993 and increases by 10% yearly to 50% by 1997.

South Dakota has drafted a bill that reportedly starts with a 10% recycled consumption target for 1992 and increases to 50% by 1996. Noncompliance would be penalized by 10% of the cost of any virgin newsprint consumed short of the goal. ■

Maine introduces recycled newsprint legislation

Maine has introduced new legislation to mandate recycled newsprint consumption that resembles parts of laws adopted in California and Connecticut last year. The bill defines recycled newsprint as in the California bill and raises consumption requirements to 90% by 1997 as in the Connecticut law.

Legislative Document 2133 defines newsprint: "uncoated paper, whether supercalendered or machine finished, of the type generally used for, but is not limited to, the publication of newspapers, commercial advertising inserts, directories, or commercial advertising mailers, which is made primarily from mechanical woodpulps combined with some chemical woodpulp." To be considered recycled newsprint, these grades must contain 40% postconsumer wastepaper. The bill proposes to require that these consumers increase the portion of recycled newsprint they use. The requirements start at 20% in 1993 and are raised by 10% each year to 90% in 1997 and beyond. However, if recycled newsprint is not available at a comparable price to virgin newsprint or within a reasonable period of time, the requirements can be waived. LD 2133 was written with to help the state implement its new comprehensive recycling law, which sets a 25% state recycling goal by 1992 and a 50% goal by 1994. ■

TISSUE

James River leads 5.7% hike on consumer tissue

James River Corp. announced that effective with orders as of Feb. 19 it would implement a 5.7% increase on its bathroom tissue brands sold on the consumer market. The increase will affect all of James River's national brands, such as Northern, Aurora, and the Marina brand on the West Coast. It isn't known whether the other big producers in the market, Procter & Gamble Co. and Scott Paper Co., will follow the increase. P&G commands about 30% of the market and in the past has shown itself to be concerned more with maintaining operating rates than maintaining prices, in the view of some of its competition.

About one year ago, P&G led a 9.8% increase on bathroom tissue in the East and an 8.0% increase in the West. This hike was supported by the other big players, but they certainly didn't succeed in getting all of the increase. With pulp prices plateauing, this year's more modest increase may have difficulty sticking.

Analyst George B. Adler of Smith Barney, Harris Upham & Co. commented, "The tissue market right now is strong enough . . . it's really a question of how much the supermarkets are aware of what is going on in the pulp market."

Tissue production in the U.S. was running at an annual rate of 5.647 million short tons through the first 11 months, a 3.0% increase from the year-earlier period, according to the American Paper Institute. This puts the operating rate at about 98%. Imports provide further proof that the tissue supply is tight: they were up 88.1% through the first ten months to 119,323 tons, the Dept. of Commerce reports. Exports declined 51.1% to 22,119 tons.

Tissue producers have been using the excuse that supplies are tight to push through price increases in the commercial and industrial tissue market. Scott and Fort Howard Corp. have both announced large expansion plans said to be needed to keep up with demand. Scott's new mill is expected to rely heavily on wastepaper for fiber, as are most new tissue machines coming onstream. Mills are finding that by incorporating more secondary fiber they can shield themselves from higher pulp costs. API noted 80% of new tissue capacity coming onstream in the next three years will be wastepaper based. ■

Procter & Gamble plans tissue expansion

Procter & Gamble Paper Products Co. has announced plans for a major expansion of its toilet tissue and paper towel business in the U.S. "at a cost well in excess of $100 million." The company has authorized funds to increase the output of its existing mills and plans to build at least one new paper machine, according to Gary T. Martin, tissue and towel category general manager. The company's present manufacturing sites include Mehoopany, Pa., Green Bay, Wis., Albany, Ga., and Oxnard, Calif.

Options under consideration include adding a new paper machine at Oxnard or building a new West Coast facility for a capital cost well in excess of $100 million, as well as investing substantial funds at existing plants. The Oxnard mill, which the company acquired in 1974 from International Paper Co., currently has one machine.

Martin said, "Procter & Gamble's tissue and towel business has experienced significant growth and business success. We are now operating near capacity and need to embark on a vigorous expansion to meet the growing consumer demand for our products." The company's toilet tissue and paper towel business includes Charmin, White Cloud, and Banner toilet tissue brands and Bounty paper towels.

The tissue market has been relatively tight, with operating rates in the 97% to 98% range last year and expected to be in the 95% to 96% range this year, according to George Adler of Smith Barney, Harris Upham & Co. Kimberly-Clark Corp., Scott Paper Co., and Fort Howard Corp. have recently announced major expansion projects that they say are necessary to keep up with demand. And James River Corp. announced a 5.7% increase on its consumer bathroom tissue brands effective Feb. 19. ■

CORPORATE STRATEGY

Abitibi to look at restructuring to cut costs

Abitibi-Price Inc. announced in late January that it would undertake a "broad review" of its operations in an effort to "focus on essential tasks" and reduce expenses. The company was battered by low earnings from its newsprint division last year, and the outlook for 1990 is even bleaker.

Abitibi already announced last December that it would permanently idle a newsprint machine at its Grand Falls, Nfld., mill on Mar. 1, and more closures may be in store. The company said it will let any of its approximately 16,000 workers know as early as possible of any plans that may affect them. All managers are being asked to find better ways to run their departments, a spokesperson said.

As one of the first moves in its physical restructuring, the company's two downtown Toronto, Ont., offices will be consolidated into the lakefront Queen's Quay development location by summer. Abitibi's sales office at Rockefeller Center in New York, N.Y., may also be moved, the company noted.

Industry observers have speculated Abitibi would be in trouble during a prolonged downturn in newsprint, as it is heavily vested in that grade. It is currently the second largest newsprint producer in the world. ■

Correction

The Top U.S. Producers table in the February 1990 Grade Profile on tissue contained the wrong information. The correct data is as follows:

Company	Annual capacity	Market share (%)
1. James River	1,111	18.6
2. Scott Paper	1,050	17.6
3. Procter & Gamble	900[1]	15.1
4. Fort Howard	850[1]	14.2
5. Georgia-Pacific	537	9.0
6. Chesapeake	150	2.5
7. Pope & Talbot	148	2.5
8. Erving Paper	100	1.7
9. APL	95	1.6

Market share of top five companies: **74.5%**

Market share of top ten companies: **82.7%**

Total U.S. capacity (1990): **5.972 million short tons**

1. *P&P* estimate.

DEINKING OF SECONDARY FIBER GAINS ACCEPTANCE AS TECHNOLOGY EVOLVES

More mills are considering deinking lines as process and equipment knowledge grows, but an analysis of options is necessary

By LAWRENCE A. BROEREN

The recent explosion of secondary fiber use in paper products has been driven by economic and legislative forces. This trend is expected to continue, with the most significant growth in deinked secondary fiber.

In the U.S., wastepaper use increased from 12 million tons in 1970 to about 15 million tons in 1979 (Figure 1). It remained at about 15 million tons for the next four years, but, in 1984, use began increasing again, reaching a high of 20 million tons in 1989.

The use of deinked secondary fiber in newsprint, tissue, and fine paper is expected to increase by 5.8 million tons in the next ten years (Figure 2). Most of the new supply of deinked secondary fiber—3.2 million tons—will be used in newsprint. That increase is based on a 25% utilization rate forecast for the year 2000. However, if the Environmental Protection Agency's goal of a 40% utilization rate is attained, an additional 1.4 million tons of deinked secondary fiber will be used in newsprint in the future.

Tissue manufacturers are expected to use 1.8 million tons of the new supply of deinked secondary fiber, and fine paper manufacturers are expected to use 0.8 million tons.

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SECONDARY FIBER ECONOMICS, LEGISLATION. Economics is one force driving the use of secondary fiber. The operating cost of producing deinked secondary fiber can be lower than producing virgin fiber. For example, an efficient deinking mill that has an economical supply of wastepaper can produce deinked fiber for fine paper at a cost of $300 to $400/ton (Table 1). The operating cost to produce virgin kraft fiber is about $300 to $500/ton, while the market price for kraft pulp can be up to $700/ton.

FIGURE 1: **Annual U.S. utilization of wastepaper consisting of mixed paper, newspaper, corrugated, pulp substitutes, and deinking grades has continually increased.**

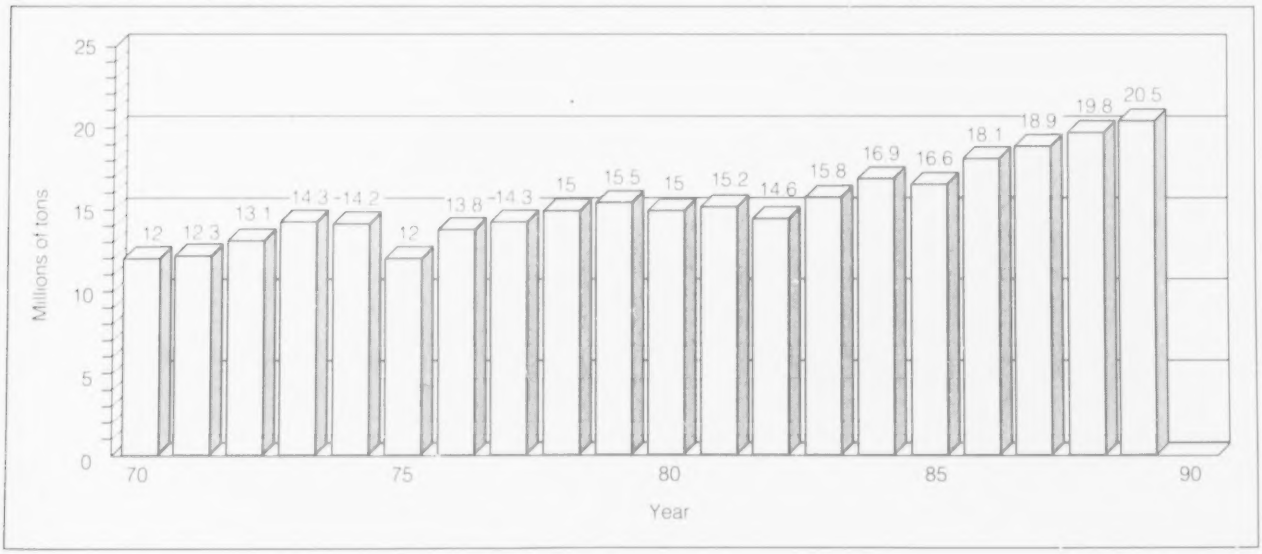


TABLE 1: **Typical operating costs to produce secondary fiber.**

	$/ton
Newsprint	140 to 170
Tissue	275 to 375
Fine paper	300 to 400

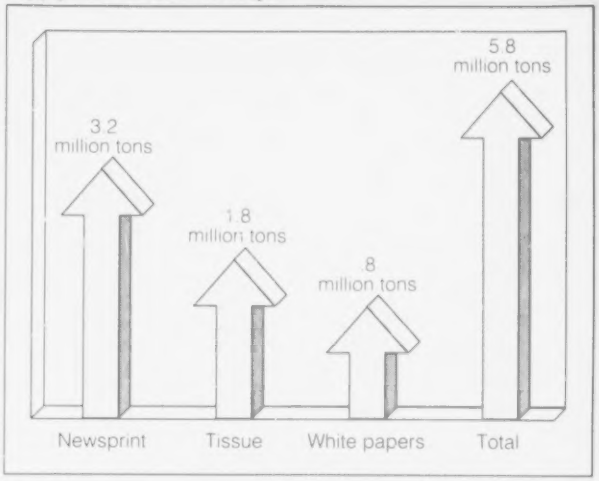
TABLE 2: **Typical capital costs (200-tpd system—in million dollars).**

	Newsprint	Tissue	Fine paper
Major equipment	8	7	11
Total direct costs	30	28	41
Total capital costs	39	36	53
Unit costs ($/daily ton)	195,000	180,000	265,000

TABLE 3: **In ten years, half of the newsprint used in California must contain at least 40% postconsumer wastepaper.**

Date of compliance	Percentage of newsprint that must contain at least 40% wastepaper
Jan. 1, 1991	25%
Jan. 1, 1994	30%
Jan. 1, 1996	35%
Jan. 1, 1998	40%
Jan. 1, 2000	50%

FIGURE 2: **The use of deinked secondary fiber is expected to increase by 5.8 million tons in the next ten years. Most of the new supply will be used in newsprint.**



The unit capital costs for a deinked secondary fiber facility are also less than for a virgin fiber facility. Unit cost is the capital cost divided by the daily production rate. Table 2 shows typical capital and unit costs for three types of deinking mills.

The unit capital cost for a deinked fiber facility for fine paper is $265,000/daily ton and is significantly lower than the unit cost of $500,000/daily ton for a virgin fiber facility. From an operating and capital cost viewpoint, it is clear why economics is driving the increased use of deinking secondary fiber.

In addition to the economic forces, however, legislative forces are also present. The goal of legislators is to encourage or require secondary fiber use to conserve forest resources and reduce the flow of waste to landfills. Federal legislation has established recycling goals and requirements for finished products. Paper towels purchased by the U.S. government, for example, must contain a specified amount of secondary fiber.

Current state legislation focuses on using secondary fiber in newsprint. States considering recycled newsprint legislation include Illinois, New Jersey, New York, and Wisconsin. In the meantime, Louisiana, Massachusetts, Nebraska, Oregon, Pennsylvania, Rhode Island, and Virginia have legislation pending. Florida, Connecticut, as well as California have already passed legislation.

In Florida, publishers pay a 10¢/ton tax on newsprint. The tax is refunded if the newsprint contains at least 50% recycled fiber. In 1992, the tax increases to 50¢/ton.

Connecticut requires newsprint to contain 20% recycled fiber by 1993 and 90% recycled fiber by 1998.

The California legislation, passed on September 29, 1989, is significant because California is a large newsprint-consuming state, and its environmental policies often influence the formation of environmental policies throughout the country.

In California, recycle-content newsprint is defined as newsprint containing at least 40% wastepaper (postconsumer). Publishers must use increasing amounts of recycle-content newsprint over the next ten years. In 1991, for example, 25% of the newsprint used by publishers must contain 40% postconsumer wastepaper. In 1994, 30% of the newsprint must contain 40% wastepaper. Table 3 shows the usage schedule required by the California legislation.

TECHNOLOGY. The quality of deinked pulp has been improved by technological improvements in deinking equipment and chemicals, even when low-quality wastepaper is processed. Significant improvements in technology have occurred in pulping, screening and cleaning, lightweight contaminant removal, flotation, and postdeinking fiber treatment.

- *Pulping.* High-consistency pulping decreases contaminant breakdown, which enhances contaminant removal. Wastepaper can be pulped at high consistency in batch and drum pulpers.
- *Screening and cleaning.* Low-reject-rate screens and cleaners have reduced the number of stages required for

efficient screening and cleaning.

• *Lightweight contaminant removal.* Lightweight contaminant removal has historically been accomplished at relatively low efficiencies. The new flowthrough centrifugal cleaners have higher lightweight contaminant removal efficiencies. A new mechanical lightweight contaminant removal device operates at an even higher efficiency than centrifugal cleaners, but is also more expensive.

• *Flotation.* Single-stage flotation systems are available. One design is pressurized, and another is atmospheric. In the pressurized system, the foam collapses as it leaves the pressure vessel. In the atmospheric system, the foam is removed from the flotation cell by vacuum and then is collapsed.

• *Postdeinking fiber treatment.* Several postdeinking fiber treatments are available. Dispersion, the most common, can be followed by flotation and/or washing. The use of postdeinking fiber treatment has been limited due to the high capital and operating costs, but it is expected to increase during the 1990s.

WASTEPAPER GRADES. The grades of wastepaper are defined in *Circular PS-83, Paper Stock Standards and Practices*, published by The Paper Stock Institute of America. Wastepaper is categorized as follows:

- Pulp substitutes
- Deinking grades
- Newspapers
- Mixed paper
- Corrugated.

Wastepaper in each category is processed differently and used in specific products (Table 4). Deinked fiber is used primarily in three finished products—tissue, newsprint, and fine paper. Deinked fiber is widely used in tissue products, and its use is growing. Many tissue products are made from 100% deinked fiber, while most newsprint does not contain it. However, because of the recycled newsprint legislation, manufacturers and publishers are showing a significant interest in deinking. Currently, nine newsprint mills in North America use deinked fiber. Of these mills, four use 100% deinked pulp.

Some manufacturers of fine paper use deinked pulp. Due to this success, favorable economics, and environmental considerations, interest is emerging in manufacturing fine paper from deinked pulp. Table 5 lists some mills using deinked pulp in tissue, newsprint, and white paper.

DEINKING PROCESSES. Manufacturers must consider three main processing parameters as they approach the design of a deinking facility:

- Which ink removal method to use
- How many chemical loops to use
- If postdeinking fiber treatment should be incorporated, and if so, what type of treatment to use.

Ink removal can be obtained by flotation, washing, or a combination of the two. A deinking system can have one chemical loop (alkaline) or two chemical loops (alkaline and acid). Postdeinking fiber treatment, if incorporated, can include dispersion or dispersion followed by flotation and/or washing.

TABLE 4: **Wastepaper in each category is processed differently and used in specific products.**

Wastepaper category	Process	Finished product
Pulp substitutes	Pulping	Fine paper Tissue
Deinking	Fine Paper Deinking	Tissue
Newspaper	Deinking	Newsprint Folding cartons
Mixed paper	Pulping Screening Cleaning	Packing Packaging Molded products
Corrugated	Pulping Screening Cleaning	Corrugated medium Linerboard Kraft towels

TABLE 5: **Tissue, newsprint, and white paper mills throughout North America are using deinked pulp as part or all of their furnish.**

Tissue mills
- Erving Paper Mills, Erving, Mass.
- Fort Howard Corp., Green Bay, Wis.
- Fort Howard Corp., Rincon, Ga.
- Wisconsin Tissue Mills, Menasha, Wis.
- James River Corp., Glens Falls, N.Y.
- James River Corp., Green Bay, Wis.
- Kimberly-Clark Corp., various locations
- Pope & Talbot Inc., Eau Claire, Wis.
- Pope and Talbot Inc., Ransom, Pa.
- Scott Paper Co., Winslow, Maine
- Tagsons Papers Inc, Mechanicville, N.Y.
- Wisconsin Tissue Mills, Menasha, Wis.

Newsprint mills
- FSC Paper Co., Alsip, Ill.
- Garden State Paper, Carfield, N.J.
- Golden State Paper, Pomona, Calif.
- Manistique Papers, Manistique, Mich.
- Quebec & Ontario Paper, Thorold, Ont.
- Smurfit Newsprint, Oregon City, Ore.
- Smurfit Newsprint, Newburg, Ore.
- Southeast Paper Manufacturing, Dublin, Ga.
- Stone Container, Snowflake, Ariz.

White paper mills
- Appleton Papers, West Carrollton, Ohio
- Fraser, Thornold, Ont.
- Boise Cascade, Vancouver, Wash.
- P.H. Glatfelter, Neenah, Wis.
- Georgia-Pacific, Kalamazoo, Mich.
- Miami Paper, West Carrollton, Ohio
- Simpson Paper, Pomona, Calif.
- Sorg Paper, Middletown, Ohio

The preferred ink removal method is flotation, followed by washing. A one-loop alkaline chemical loop is best for tissue and white paper. For newsprint, a one-loop system is used with washing, and a one- or two-loop system can be used with flotation.

Postdeinking fiber treatment enhances the quality of deinked pulp and is often incorporated to reach the highest quality level or to allow the use of lower-quality wastepaper. The postdeinking treatment systems are relatively expensive in both capital and operating costs.

DEINKING CHEMICALS AND EQUIPMENT. The deinking process involves both mechanical and chemical systems. Both are equally important. The following chemicals typically used are for deinking and bleaching:

Deinking chemicals
- Caustic
- Sodium silicate
- Hydrogen peroxide
- Calcium chloride
- Soap

Bleaching chemicals
- Hydrogen peroxide
- Hydrosulfite.

Five major equipment suppliers can provide a complete or nearly complete deinking system: Beloit Jones, Black Clawson, Bird Escher Wyss, FiberPrep (Lamort), and Voith. These companies can supply information, assist in arranging deinking mill visits, and conduct deinking trials. Table 6 shows some of the major deinking equipment suppliers and the equipment they manufacture.

The optimum deinking system is a multi-supplier, "mix and match" system, where the most suitable equipment is selected for each process step. The capital cost is also usually lower with a mix-and-match system because the most cost-effective equipment can be selected.

Figures 3, 4, 5, and 6 show typical system designs for two newsprint deinking systems (a one-loop and a two-loop system), a tissue system, as well as a fine paper system.

TABLE 6: **Some of the major deinking equipment suppliers and the equipment they manufacture.**

Suppliers	Equipment
Ahlstrom	Drum pulpers, screens
Arus Andritz	Belt presses
Celleco	Cleaners, disc thickeners
Dorr-Oliver	Washers, disc thickeners
Finckh	Drum pulpers, screens
Hooper	Gravity deckers, screens
Hymac (Thune)	Screw presses, gravity deckers
Krofta	Clarifiers

FIGURE 3: **A block flow for a one-chemical-loop newsprint deinking system.**

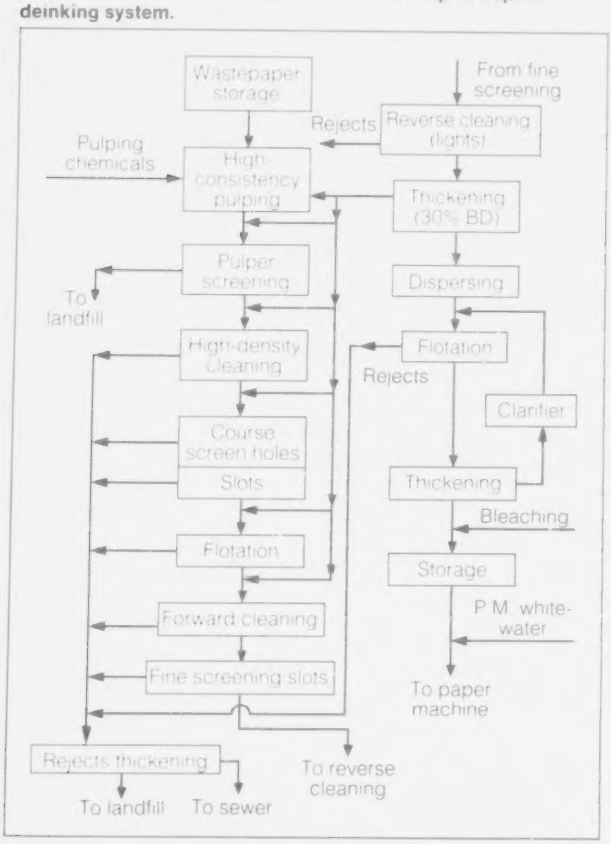
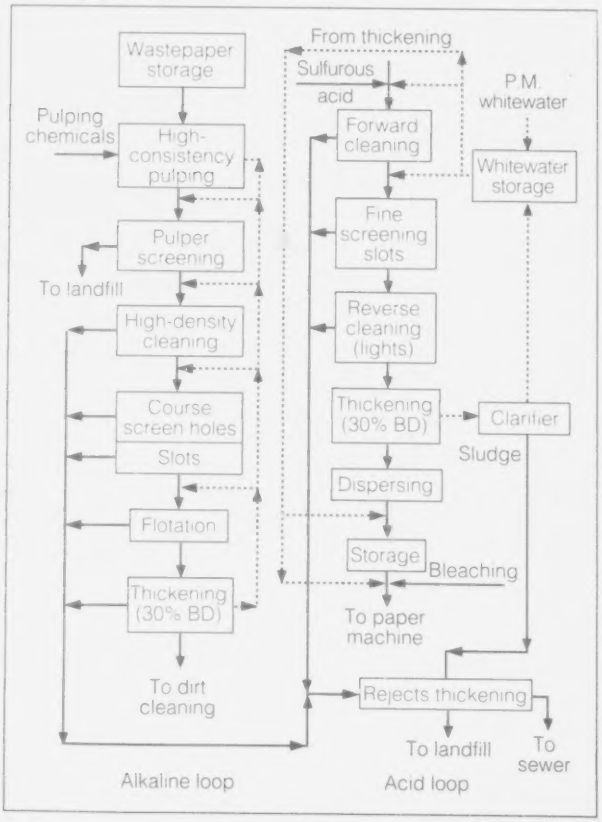


FIGURE 4: **A block flow for a two-chemical-loop newsprint deinking system.**



THE ELEMENTS OF A DEINKING PROGRAM. The four major elements of a deinking program include wastepaper procurement, finished product requirements (defined by end use requirements), the deinking process (both mechanical and chemical systems), and management involvement, including support for R&D.

Procurement, including wastepaper testing, downgrading, and rejection, is the foundation of a successful deinking program. One step in developing a deinking program is a study of wastepaper availability and quality. Considerations include price, quantities, location, and shipping.

Another step is visiting several deinking facilities. Most North American deinking facilities are closed to visits, but European facilities are more accommodating. Equipment supplier presentations can also provide an opportunity to find out what equipment and processes are available.

Deinking program leaders need to bring together the people within their organization that have expertise in a variety of areas, including research, operations, management, and engineering. Engineering consultants can also be helpful.

Deinking trials should be run, but there are limitations to such trials. For example, whitewater is not recycled during a trial, and trials are usually too short to optimize chemical usage.

R&D should be part of a deinking program to assist in defining the process and finding solutions to deinking problems and operation. For example, one current problem in newsprint deinking is removing letterpress printing ink from the washing filtrate. The ink is readily removed from the fiber but is difficult to remove from the filtrate during clarification. Hence, it is recirculated back into the deinking process. As the use of letterpress printing increases, a way to get the letterpress ink out of the system will have to be developed.

Likewise, nonimpact inks are difficult to remove and, further, can show up in the finished product as ink specks. As new inks, binders, and printing processes are developed, there will be no shortage of problems that will need to be solved. It is important, therefore, for management to support R&D so it can meet the challenges deinking provides.

A list of the critical factors in developing a successful deinking program includes the following:

- Acceptance
- Research
- Development
- Investigation
- Reasonable facility
- Procurement.

Finding the right combination of deinking equipment and processes is like trying to solve Rubic's Cube. There are numerous ways to solve the puzzle, and, at first, the myriad of combinations and interrelationships of moves can be overwhelming. As time goes on, however, the patterns and results of moves become clearer. ■

FIGURE 5: **A block flow for a tissue deinking system.**

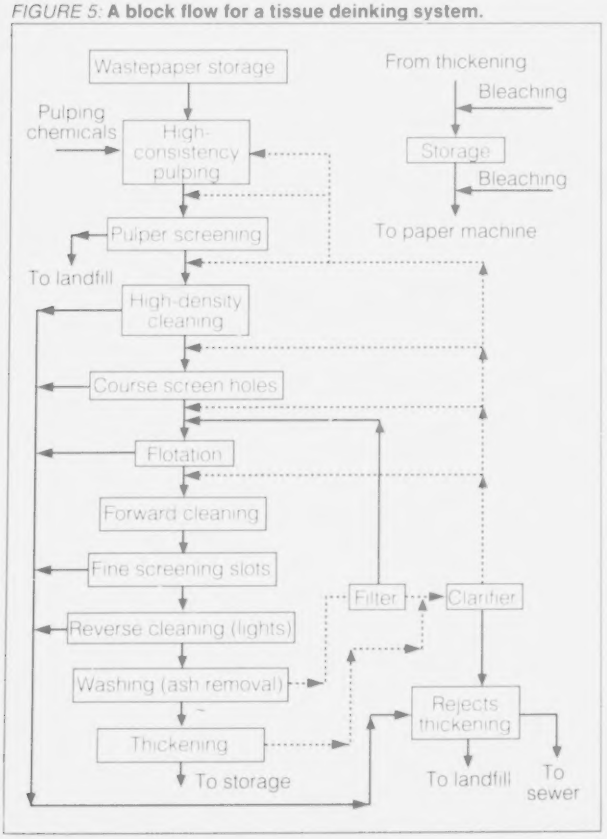
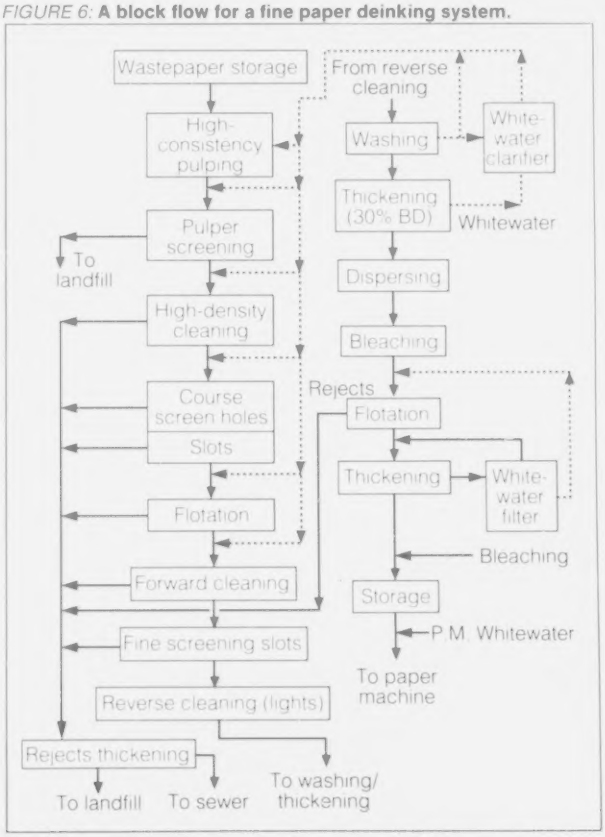


FIGURE 6: **A block flow for a fine paper deinking system.**



DEINKING EQUIPMENT DEMAND INCREASES AS MORE MILLS STUDY WASTEPAPER USE

Major suppliers worldwide discuss their process equipment developments for improving pulp cleanliness and brightness

By JOHN PEARSON, International Editor

Wastepaper looks set to become an increasingly important part of the papermaking furnish during the 1990s. Currently, worldwide wastepaper consumption is about 31% of total paper and board production. By the end of the decade, that figure could pass 40%. Pressures leading to the increased utilization rate are numerous and include environmental concerns among both consumers and governments and tight virgin fiber supplies in some countries.

Legislative changes may put a burden on papermakers to raise the wastepaper content of their furnishes. But, at the same time, consumers will continue to demand high-quality paper grades. For this reason, all major suppliers of deinking equipment are developing systems to improve cleanliness and brightness. Improved dispersion and combined flotation deinking and washing systems are among the latest developments.

BDS FORMS THE BUILDING BLOCK. Voith, of Fed. Rep. Germany, has designed a new elliptical deinking cell, said to allow better air flow to a larger surface area. Apart from this, other design aspects, such as plugging-proof injectors and self-priming air intake, remain as in previous models. To meet demands for larger systems, the company now offers a module that can handle 320 tpd of accept in one line.

Process development from Voith involves the use of dispersing machines, bleaching during dispersion, flotation after dispersion, and combined washing and flotation systems. One such system, for producing a 100% deinked furnish for newsprint, starts with what Voith calls the standard BDS sequence (pulping, prescreening at medium consistency, flotation deinking, cleaning, low-consistency screening, and dewatering). This is followed by combined dispersing and peroxide bleaching, followed by hydrosulfite bleaching. The final product has a brightness of 65 to 68 ISO.

Voith says the highest achievable results have been reached with a system consisting of a BDS sequence followed by dispersing with peroxide bleaching, flotation, thickening, and hydrosulfite bleaching. Process waters from the BDS and flotation and thickening stages are collected, treated, and recycled. The resulting pulp has a brightness of 70 to 72 and can be used in fine paper or super-newsprint grades.

For tissue production, Voith recommends BDS, followed by washing/thickening (initial brightness 65 to 70), dispersing, hydrosulfite bleaching, and washing/thickening. Final stock brightness of greater than 80 can be reached. Process waters are clarified and ash and fillers removed. A similar system could also be used in the case of wastepaper containing a high proportion of flexo inks. Washing and clarification are said to take care of the unfloatable inks.

SPLIT FLOTATION GAINS ACCEPTANCE. Explaining its strategy, Sulzer Wyss (SEW) of Ravensburg, Fed. Rep. Germany, says it developed the concept of "split flotation" some years ago and that this idea has since found wide acceptance.

Secondary fiber used by papermakers today contains a number of printing inks, coatings, and other components that disturb the traditional deinking system. SEW says these printing inks can be divided into two groups: soft and greasy, and brittle and hard. Soft, greasy inks must be treated gently, with low energy density. If the energy density is too high, these types of inks are wiped onto the fibers, leading to greyness in the stock. For this reason, soft, greasy particles are removed before dispersion by screening, cleaning, preflotation, and washing and/or partial washing.

Hard, brittle inks are reduced to a grain size by dispersion (intensive fiber treatment). These can then be washed and floated off. Further flotation and washing can be used if necessary. SEW says this split-flotation method leads to a very clean half stuff with a high brightness. Washing out of fibers on the paper machine is also minimized by this method, says the company.

FINAL ASH CONTENT OF 2% ACHIEVED. Black Clawson International, U.K., makes similar points. The trend, says the company, is to use three basic elements in the deinking process: flotation, washing, and disper-

TABLE 1: **Some recent and planned flotation deinking installations. (Table 1 continues on p. 82.)**

Country	Company name	Mill location	Startup date	Capacity (000 tpy)	Wastepaper grade	End use	Supplier
Austria	Steyrermühl	Steyrermühl	1989	84	Np, Mag	Newsprint	Voith
Brazil	Clinton Pessoa	Santa Therezinha	1988	42	Mag, Wf waste	Tissue	Sulzer Escher Wyss
Brazil	Scott Copa	Cruzeiro	1988	30	Mag, List	Tissue	Voith
Canada	Atlantic Packaging Corp.	Scarborough, Ont.	1988	60	Ctd, Unctd	Tissue	Voith
Canada	Atlantic Packaging Corp.	Scarborough, Ont.	1988	150	Np, Mag	Newsprint	Voith
Canada	Cascades Inc.[1]	Kingsey Falls, Que.	1990	64	Led	Tissue	Beloit
Canada	Cascades Inc.	East Angus	1990	21	Ctd bk, List, Mag	White board	Lamort-Fiberprep
Canada	Kruger Inc.	Bromptonville	1990	63	Np, Mag	Newsprint	Lamort-Fiberprep
Chile	CMPC	Puente Alto	1991	53	Mixed waste, Np, Mag	Tissue	Lamort
China	Yingkou[1]	—	1990	10	Np	Linerboard	Black Clawson Int
Colombia	Familia	Medellin	1991	21	Off. waste	Tissue	Lamort
Colombia	Papeles Nacionales	Pereira	1990	18	Wt	Tissue	Lamort
Costa Rica	Tissue producer	—	1989	7	Mag, Led, Ctd	Tissue	Sulzer Escher Wyss
Czechoslovakia	Steti	Steti	1991	35	Np, Mag	Newsprint	Lamort
Denmark	Brodrene Hartmann	Tondem	1989	18	Np, Mag	Egg trays	Sulzer Escher Wyss
Denmark	De Forenede Papir	Copenhagen	1991	42	Wf sorted paper	Tissue	Sulzer Escher Wyss
Ecuador	Technopapel	Quito	1990	9	Np, Mag	Tissue	Lamort
Finland	Tampella	Tampere	1991	25	Np, Mag	FBB	Sulzer Escher Wyss
Finland	United Paper Mills	Kaipola	1989	135	Np, Mag	Newsprint	Voith
Finland	United Paper Mills	Kaipola	1989	120	Np, Mag	Newsprint	Voith
France	Matussière-et-Forest	Turckheim	1988	42	Mag, Prom	Pr/wr	Voith
France	Matussière-et-Forest	St. Girons	1989	21	Mag	—	Voith
France	Papeteries du Bourray	St. Mars-la-Brière	1988	28	Prom, pr trim, List	Pr/wr	Lamort
France	Papeteries d'Essones	Corbeil-Essones	1989	42	Mag, Np, bk, lacq	Pr/wr	Lamort
Germany, Fed. Rep.	Euler	Bensheim	1988	16	NCR broke	File board	Lamort
Germany, Fed. Rep.	Friedrich Erfurt	Wuppertal	1990	28	Wf paper	Wallpaper base	Voith
Germany, Fed. Rep.	Gruber-Weber	Gernsbach	1990	53	Wdcntng, wf	Topliner	Sulzer Escher Wyss
Germany, Fed. Rep.	Haindl Papier	Schongau	1989	265	Np, Mag	Newsprint	Voith
Germany, Fed. Rep.	Hermes	Düsseldorf	1990	44	Sorted waste	Pr/wr	Sulzer Escher Wyss
Germany, Fed. Rep.	Niederauer Mühle	Düren	1989	28	Mixed waste	Board	Voith
Germany, Fed. Rep.	Not disclosed	—	1989	77	Wdcntng, wf	Tissue	Sulzer Escher Wyss
Germany, Fed. Rep.	Strepp	Kreuzau	1989	50	Wdcntng pr/wr	Tissue	Voith
Germany, Fed. Rep.	Peter Temming	Glückstadt	1990	53	Np, mag	Pr/wr	Lamort
Germany, Fed. Rep.	Peter Temming	Glückstadt	1990	35	Np, mag	Pr/wr	Lamort
Germany, Fed. Rep.	Peter Temming	Glückstadt	1990	21	Np, mag	Pr/wr	Lamort
Germany, Fed. Rep.	Not disclosed	—	1989	42	Sorted waste	Tissue	Sulzer Escher Wyss
Germany, Fed. Rep.	Not disclosed	—	1989	44	Sorted waste	Tissue	Sulzer Escher Wyss
Honduras	Tissue producer	—	1989	4	Ctd paper, Led	Tissue	Sulzer Escher Wyss
Indonesia	Fajar Surya	—	1990	25	Col. led	White board	Lamort-Aikawa
Indonesia	PT Pakerin	Surabaya	1990	28	Sorted Waste, List	Tissue	Sulzer Escher Wyss
Indonesia	PT Pakerin[1]	—	1990	8	Led	Board	Black Clawson Int
Indonesia	Surya Kertas	—	1988	21	Col. led	Pr/wr	Lamort-Aikawa
Indonesia	Surya Kertas	—	1991	21	Np	White board	Lamort-Aikawa
Italy	Cartiera Lucchese	Porcari	1990	70	Wt	MG papers	Lamort
Japan	Daini Paper	—	1988	18	Np	Printings	Lamort-Aikawa
Japan	Iyo Paper	—	1988	12	Col. leg	Tissue	Lamort-Aikawa
Japan	Hyogo Seishi	—	1989	20	—	Newsprint	Voith
Japan	Nihonkako Paper	Takahagi	1989	21	Ctd wf book	Ctd paper	Lamort-Aikawa
Japan	Nihonkako Paper	Takahagi	1989	21	Ctd wf book	Ctd paper	Lamort-Aikawa
Japan	Nihonkako Paper	Takahagi	1990	21	Ctd wf book	Ctd paper	Lamort-Aikawa
Japan	Nihonkako Paper	Takahagi	1990	21	Ctd wf book	Ctd paper	Lamort-Aikawa

1. Flotation/washing system. Abbreviations: Ctd = coated; Unctd = uncoated; FBB = folding boxboard; Np = newspaper; Mag = magazines; Prom = promotional material; Led = ledgers; List = computer listings; Pr/wr = printings/writings; Wdcntng = woodcontaining paper; Wf = woodfree paper, HPBK = heavily printed bleached kraft.

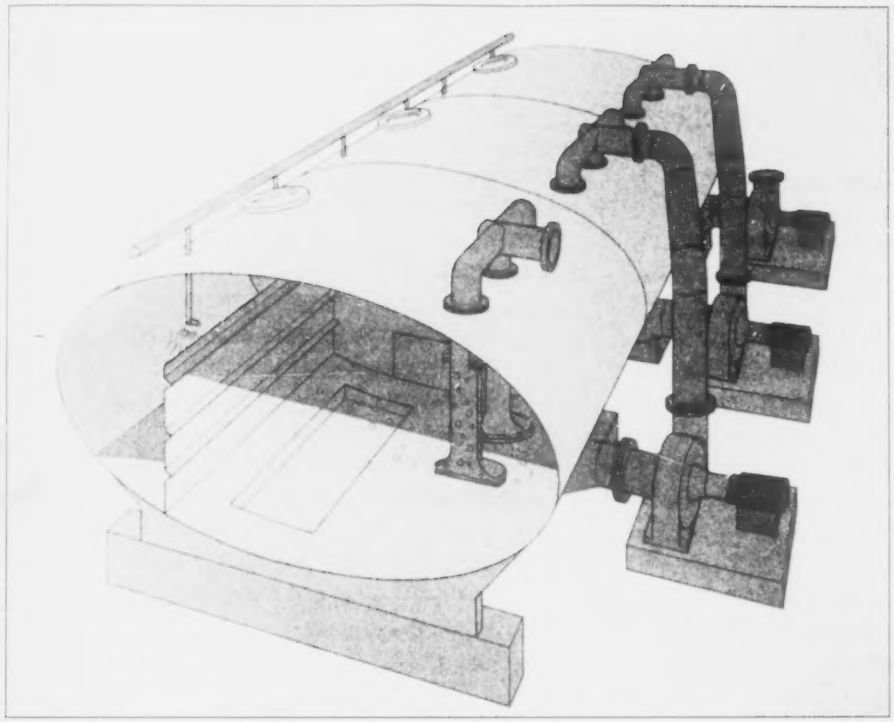
sion. Treatment of the clarified water loop to remove residual inks (particularly flexo inks) is seen as a growing trend.

For the preparation of wastepaper stock for tissue production, BCI has introduced its new DNT Washer. It is said to be highly effective in removing inks and ash. Final ash contents of less than 2% are achieved using a ledger furnish containing over 25% ash.

TABLE 1, continued: **Some recent and planned flotation deinking installations.**

Country	Company name	Mill location	Startup date	Capacity (000 tpy)	Wastepaper grade	End use	Supplier
Japan	Taio	Iyomishima	1989	45	Np	Pr/wr	Voith
Japan	Taio	Kawanoe	1989	60	Mag	Newsprint	Voith
Japan	Taio	Mishima	1989	110	—	Newsprint	Voith
Japan	Takao Paper	—	1989	35	Np, List	Comic book	Lamort-Aikawa
Japan	Tamagawa Paper	—	1990	28	Np, List	Comic book	Lamort-Aikawa
Japan	Tokai Pulp	Shimada	1989	46	Np	Copier paper	Lamort-Aikawa
Kenya	Panafrican Paper Mills	Webuye	1991	26	Wf	Pr/wr	Lamort
Rep. Korea	Mitto Paper	Seoul	1990	53	Wf waste	Pr/wr	Sulzer Escher Wyss
Malaysia	Not disclosed	—	1989	18	Led, List	Tissue	Sulzer Escher Wyss
Mexico	Inpamex (Copamex)	Uruapan	1989	35	List, white led	Pr/wr, tissue	Lamort-Licar
Mexico	Kimberly-Clark Corp.	Bajlo	1991	210	Mag, List	Tissue	Sulzer Escher Wyss
Mexico	Papeleras Higienicos	Monterrey	1989	25	Mag, office waste	Tissue	Sulzer Escher Wyss
Netherlands	Celtona BV	Cuyck	1991	26	Ctd wf board	Tissue	Lamort
Netherlands	Celtona BV	Cyuck	1990	53	Ctd wf board	Tissue	Lamort
Netherlands	Van Houtum BV	Swaimen	1990	28	Np, Mag	Tissue	Lamort
Pakistan	Packages	Lahore	1988	7	Wdcntng, Wf	Tissue, MG	Sulzer Escher Wyss
Romania	Piatra Neamt	—	1990	20	Mixed waste	White liner	Beloit
Spain	Echezarreta SA	Legorreta	1988	30	List	Printings	Lamort-Licar
Spain	Papelera d'Orpi SA	Carme	1988	5	Office waste, Np	Tissue	Lamort-Licar
Spain	Romani Esteve SA	Barcelona	1990	28	Led, News, White bd	White liner	Beloit
Sweden	Hyite Bruk[1]	Hyite	1989	175	Np, Mag	Newsprint	Beloit
Taiwan	Ban Yu[1]	—	1989	60	Np	Board	Black Clawson Intl.
Taiwan	Ban Yu[1]	—	1989	60	Np	Board	Black Clawson Intl.
Taiwan	Cheng Loong	Taipei	1990	25	Mag, Wf, List	Pr/wr	Sulzer Escher Wyss
Taiwan	YFYu[1]	—	1990	30	Led	Board	Black Clawson Int
Thailand	Hiang Seng	Bangkok	1990	18	FBB, Wf waste	Liner, pr/wr	Sulzer Escher Wyss
Thailand	Patcharavit	Bangkok	1989	9	Sorted waste	Tissue	Sulzer Escher Wyss
Thailand	Not disclosed	—	1989	14	Led, List	Tissue	Sulzer Escher Wyss
U.K.	Kimberly-Clark Ltd.	Coleshill	1991	26	Wf	Tissue	Lamort
U.K.	Shotton Paper Co.	Shotton	1989	165	Np, Mag	Newsprint	Voith
U.S.	Atlas Tissue Mills[1]	Hialeah, Fla.	1990	25	Led	Tissue	Beloit
U.S.	Erving Paper Mills[1]	Erving, Mass.	1989	32	Led	Tissue	Beloit
U.S.	F.S.C. Paper Co.	Alsip, Ill.	1990	81	Led, List, Mag	Tissue	Sulzer Escher Wyss
U.S.	James River Corp.	Ashland, Wis.	1988	37	Ctd pr/wr	Tissue	Voith
U.S.	James River Corp.	Green Bay, Wis.	1989	85	Led	Tissue	Voith
U.S.	Miami Paper	W. Carrollton, Fla.	1988	55	Led	Pr/wr	Sulzer Escher Wyss
U.S.	Miami Paper	W. Carrollton, Fla.	1988	55	Led	Pr/wr	Sulzer Escher Wyss
U.S.	Putney Paper Co.	Putney, Vt.	1989	9	Led, cup stock	Tissue	Sulzer Escher Wyss
U.S.	Smurfit Newsprint Corp.[1]	Oregon City, Ore.	1989	130	Np, Mag	Newsprint	Beloit
U.S.	Sorg Paper Corp.	Middletown, Ohio	1989	44	Book,Led,cup stock	Tissue, pr/wr	Sulzer Escher Wyss
U.S.	Stone Container Corp.[1]	Snowflake, Ariz.	1988	110	Np, Mag	Newsprint	Beloit
U.S.	Stone Container Corp.[1]	Snowflake, Ariz.	1989	125	Np, Mag	Newsprint	Beloit
U.S.	Tagsons Papers Inc.[1]	Mechanicville, N.Y.	1990	16	Np, Mag	Tissue	Beloit
U.S.	Tissue producer	—	1990	65	Ctd paper, Led	Tissue	Sulzer Excher Wyss
U.S.	Tissue producer	—	1989	23	HPBK	Tissue, pulp	Sulzer Escher Wyss
U.S.	Not disclosed[1]	—	1989	80	Led	Tissue	Beloit
U.S.	Not disclosed	—	1990	80	Np, Mag	Newsprint	Beloit
U.S.	Not disclosed	—	1990	160	Np	Newsprint	Beloit
U.S.	Not disclosed	—	1989	70	Mag	Newsprint	Voith
Venezuela	Maracay	Maracay	1990	32	Led	Tissue	Beloit
Yugoslavia	Krsko	Krsko	1990	48	Np, Mag, Led	Pr/wr,Newspr	Beloit

1. Flotation/washing system. Abbreviations: Ctd = coated; Unctd = uncoated; FBB = folding boxboard; Np = newspaper; Mag = magazines; Prom = promotional material; Led = ledgers; List = computer listings; Pr/wr = printings/writings; Wdcntng = woodcontaining paper; Wf = woodfree paper; HPBK = heavily printed bleached kraft.



Voith's new flotation cell is elliptical for better air flow.

HYLTE SHOWS THE WAY. This year's reference list from Beloit also shows an increasing use of combined flotation-washing deinking systems. One 500-tpd line is at Hylte Bruk in Sweden. It uses Beloit's Pressurized Deinking Modules (PDMs) for the deinking process. Immediately after these, stock is treated in the forward cleaners and is then thickened and diluted four times in Hedemora disc filters and Thune screw presses. An after-flotation stage, with two more PDM units, is used to remove residual ink.

DEINKING STARTS WITH THE PULPER. Reviewing developments in deinked pulp for tissue making, French group Lamort says that new printing inks, lacquers and contaminants, present in increasing quantities, have required changes to the traditional washing-hot dispersion line. The company says it believes deinking starts with the repulping equipment. Its Helico Pulper is designed to achieve ink detachment and ink calibration adapted to washing or flotation deinking. Industrial studies using laser inks have shown that the dot count is reduced by at least 50% when changing from a low consistency to a Helipoire system, adds the company.

Flotation deinking is now commonly used in tissue systems for removing ink specks that would not otherwise be washed out. Plug-free MT injectors and the ability to operate with double or single aeration are features of the group's Verticel flotation deinking cell. The company says the Verticel achieved a market share of 35% in new deinking lines for tissue production in 1989, up from 25% in 1988.

Lamort's opinion on stickies and varnishes is that hot dispersion is not sufficient. Removal is the only cure. The T version of its Gyroclean is said to develop an efficiency of 95 to 99%, compared with 70 to 75% for conventional reverse cyclones in a single stage or lower with two or three stages. The new unit, which has a capacity of up to 520 m^3/hour at 1.6% consistency, can be placed before or after flotation. For removing varnish and lacquer specks, Lamort has introduced the ELP 136, 3-in. cleaner. It is said to develop efficiencies of 85 to 95%.

Turning to newsprint production, Lamort says the deinking line put on the pulping equipment should integrate flotation deinking and washing, depending on grammage and the percentage of deinked pulp used. Again, stress is put on the deinking equipment, which should allow efficient ink detachment. For removing stickies, Lamort quotes a trial using a Gyroclean T at a European newsprint mill. The mill used the unit to clean 45% to 50% of the deinked pulp flow to its twin-wire paper machine. As a result, any unplanned downtime for wire cleaning has been eliminated, says Lamort.

Finally, on printings/writings, Lamort says that a major development is selective flotation of washer filtrate. The combined high-yield, washing-flotation system is said to result in high brightnesses. ■

DEMAND INCREASES FOR RECYCLED PRINTING AND WRITING PAPER

Improved quality and the issue of solid waste disposal has increased demand from both the public and private sectors

By ROBERT B. GALIN, News Editor

Mills, merchants, and customers are beginning to realize that recycling is an issue that won't go away. As the paper industry fights tough mandatory recycling legislation, customers are increasing their requests for access to quality recycled paper, particularly in the printing and writing grades.

"Merchants know that there's a demand out there on the part of customers for more recycled products," says John J. Buckley Jr., president of the National Paper Trade Assn. (NPTA). "This is no longer an issue of just the maniacs and the radicals—it's becoming more and more of an issue for mainline customers [such as printers]," Buckley says.

"Merchants are finding the biggest demand for recycled printing and writing paper right now is in big business [and] the government contract business," he adds.

What's leading this realization is the very visible problem of what to do with the accumulation of solid waste, about 41% of which is composed of paper and paperboard, according to the National Solid Waste Management Assn. That's about 65 million tons of garbage in 1986 alone.

"The issue of disposal of solid waste is at an absolute critical point. The paper industry is going to have to address that," says Jobe B. Morrison, president of Miami Paper Corp., a unit of Cross Pointe Paper Corp., a Pentair Inc. company. Cross Pointe sells a variety of recycled paper from its Miami mill in West Carrollton, Ohio, and Flambeau Paper in Park Falls, Wis.

Morrison says there are correlative issues, such as dioxins resulting from the bleaching of recycled fiber. He wonders if the public is prepared to accept less bright or off-color paper.

These recycled grades—as opposed to those using clean, preconsumer or precommercial waste—are not what many customers are used to seeing, explains Bill Litviak, a sales representative for Wilcox-Walter-Furlong Paper Co. WWF Paper represents Cross Pointe, P.H. Glatfelter Co., and French Paper Co.

Shelley Hamel, marketing coordinator at Earth Care Paper Co., a mail order retailer of recycled paper products, thinks the public is indeed ready for such paper. In fact, she says, the company's most popular business paper is called Minimum Impact, an unbleached, 100% recycled paper from Glatfelter. Minimum Impact has "kind of" a beige color.

The biggest problem, Hamel says, is the price differential between recycled-fiber paper and virgin-fiber paper. Currently, recycled grades cost about 10% more than their virgin fiber counterparts. The price differential has increased recently because of strong discounts in virgin-fiber uncoated free-sheet paper while demand for recycled papers has increased.

NPTA's Buckley agrees but says there's a gap between what customers say they want and what they're actually willing to pay for. "There is a strong feeling out there that no one is willing to pay more to get a recycled fiber [paper]." They may say they're willing to accept slightly lower quality and performance, but when it comes to spending more, they back off and choose the virgin fiber, Buckley says.

Still, Hamel says her company is experiencing rapid growth. "Customers want to buy recycled paper," she says. Earth Care sells copy and forms paper, stationery, note cards, and other products directly to consumers, retail stores, and other customers.

Litviak says some customers, particularly printers, had bad experiences with 100% recycled paper in the 1970s. That paper had problems with stability and runability. Now, however, improved quality has pushed demand for recycled printing and writing paper beyond the fad stage.

Currently, about 34 mills in North America are producing at least a small amount of printing/writing paper they classify as recycled (Table 1). However, many of these mills use primarily preconsumer or precommercial waste, which means they are often such "waste" as envelope clippings and other high-grade, clean white pulp substitutes.

Mills such as Hammermill Papers and Westvaco Corp. have introduced recycled grades with at least 50% wastepaper, although it is preconsumer. Nekoosa

Papers Inc. has introduced a lower-brightness copy paper made with some deinked fiber (*P&P*, Jan. 1990, p. 37).

MERCHANTS GET INVOLVED. There are essentially three issues in the solid waste problem, says Buckley of NPTA. One is stemming the reduction of resources. The second is incineration/energy generation. The third is recycling.

NPTA has formed a Solid Waste Action Network, which so far has about 100 volunteers from member locations. When the network becomes mobilized, these

TABLE 1: **Recycled printing/writing paper mills.**

Company	Mill	Capacity*	Wastepaper content (%)	Grades
Appleton Papers Inc.	West Carrollton, Ohio	122,000 tpy	50	Carbonless
C.P.M. Inc.	Claremont, N.H.	11,440 tpy[1]	50 to 100	Kraft/white envelope, school construction
	East Ryegate, Vt.	17,160 tpy[1]	50 to 100	Envelope, other
Cross Pointe Paper Corp.[2]				
Miami Paper	West Carrollton, Ohio	110,000 tpy	50	Book, text and cover, 25% cotton, opaque
Flambeau Paper	Park Falls, Wis.	133,500 tpy	50	Cover and text
Domtar Inc.	St. Catharines, Ont.	250 tpd	100	Writing, envelope stock
Eastern Fine Paper Inc.	Brewer, Maine	64,000 tpy	50	25% cotton, offset, mimeo, copy
Exton Paper Manufacturers	Modena, Pa.	60 tpd	n.a.	Kraft for envelope, wrapping, etc.
Fox River Paper Corp.	Appleton, Wis.	35,570 tpy	100[3]	Cotton, cover, opaque, typewriter
French Paper Co.	Niles, Mich.	18,000 tpy	50+	Cover and text
Georgia-Pacific Corp.	Gilman, Vt.	71,000 tpy	50	Copy
	Kalamazoo, Mich.	140,000 tpy	50	Copy
P.H. Glatfelter Co.	Neenah, Wis.	135,000 tpy	50	Book, writing, envelope, film-coated offset
IP/Hammermill Papers	Oswego, N.Y.	74,760 tpy	50	Copy
Hopper Paper[4]	Taylorville, Ill.	37,000 tpy	50	Cover and text, writing
	Reading, Pa.	20,000 tpy	50	Cover and text, writing
James River Corp.	Ypsilanti, Mich.	17,800 tpy	50+	Text and cover
JR-Fitchburg	Fitchburg, Mass.	52 tpd	50+	Cover
Kerwin/Riverside	Appleton, Wis.	42,600 tpy	50/92	Writing band, school construction
Lyons Falls Pulp & Paper Inc.	Lyons Falls, N.Y.	76,000 tpy	50	Book, reply card, tablet, forms, specialties
Manistique Papers Inc.	Manistique, Mich.	35,500 tpy	100	Groundwood specialties
Nekoosa Papers Inc.	Nekoosa/Port Edwards, Wis.	160,200 tpy[5]	50**	Copy
Noranda Forest Inc.	Thorold, Ont.	102,000 mtpy	50[6]	Book, forms, copy, envelope, tablet
Potsdam Paper Mills	Potsdam, N.Y.	65,000 tpy	40+	Opaque offset, writing, book
Putney Paper Co.	Putney, Vt.	25,000 tpy	up to 100	MG/MF printing, coated book, ledger, thin
Simpson Paper Co.	Pomona, Calif.	120,000 tpy	25 to 60[7]	Copy
	Ripon, Calif.	39,000 tpy	25 to 60[7]	Copy
	Vicksburg, Mich.	35,000 tpy	25 to 60[7]	Copy
Sorg Paper Co.[8]	Middletown, Ohio	74,750 tpy	50 to 100[9]	Bond, offset, book
Valentine Paper Co.	Lockport, La.	49,840 tpy	50	Offset, tablet, reply card
Ward Paper Co.	Merrill, Wis.	35,000 tpy	100	Watermarked bond, mimeo, duplicator
Watervliet Paper Co.	Watervliet, Mich.	40,000 tpy	50 to 85	Coated and uncoated book offset
Westvaco Corp.	Tyrone, Pa.	87,220 tpy	50	Envelope paper
Geo. A. Whiting Paper Co.	Menasha, Wis.	9,000 tpy	80 average	Cover and text
Cascades/Steinbeis	East Angus, Que.		Under study	
	Niagara Falls, N.Y.			
Champion International Corp.	Hamilton, Ohio		Under study	
Daishowa Forest Products	Port Angeles, Wash.,		Under study	
	Quebec City, Que.			
Hyde Park Paper Inc.[10]	Boston, Mass.	55,000 tpy	Closed	Copy, book, offset, cover
Mi Ho Paper	St. Joseph, Mo.		Under study	
Performance Papers Inc.	Kalamazoo, Mich.	250 to 300 tpd	Closed	Book, other

*Tonnage is total mill capacity, except as noted.
**Postcommercial and/or postconsumer wastepaper.
1. Estimated average: Claremont produces 40 tpd and East Ryegate 60 tpd operating five to six days/week.
2. Subsidiary of Pentair Inc.
3. 100% recycled 10 to 15% postconsumer waste.
4. Separate operating company of Georgia-Pacific Corp. Will be using 50% postconsumer in 1990.
5. Less than 50,000 tpy recycled.
6. 5% postconsumer, 45% postcommercial.
7. 25%, 50% and 50% plus 10% postconsumer.
8. Subsidiary of Mosinee Paper Corp.
9. 50 to 100% with 10% postconsumer.
10. Leased from James River; new buyer possible.
Sources: E.H. Pechan & Associates Inc., *Pulp & Paper Week*, *Pulp & Paper Forecaster*.

and other volunteers will become educated on resource issues and will take an active interest in local issues related to recycling and waste management.

The purpose of the network is to help educate the industry while the industry helps educate the public. It is an effort to influence legislation on a local level. Already, many states and municipalities have implemented or are considering strict legislation on recycling and the content of recycled paper (*P&P*, Jan. 1990, p. 39).

NPTA's effort is separate from the approximately $4-million program being implemented by the American Paper Institute this year, though the NPTA also works with API, Buckley says. ■

TABLE 2: **North American recycled newsprint producers.**

Company	Mill	Capacity (metric tpy)	Recycled content (%)	Publisher equity (%)
U.S.				
F.S.C. Paper Co.	Alsip, Ill.	121,500	100	—
Garden State Paper Co.	Garfield, N.J.	199,500	100	Media General Inc. (100%)
Golden State Newsprint Co.	Pomona, Calif.	122,500	100	—
Manistique Papers Inc.	Manistique, Mich.	56,000	100	—
North Pacific Paper Corp.	Longview, Wash.	704,000[1]	25[2]	—
Jefferson Smurfit Corp.	Newberg, Ore.	350,000	50	The Times Mirror Co. (20%)
	Oregon City, Ore.	217,000	50	The Times Mirror Co. (20%)
Southeast Paper Manufacturing Co.	Dublin, Ga.	415,000[3]	95	Cox Enterprises Inc. (33⅓%) Knight-Rider Inc. (33⅓%) Media General Inc. (33⅓%)
Stone Container Corp.	Snowflake, Ariz.	264,100	60	—
Canada				
Atlantic Packaging Corp.	Whitby, Ont.	136,100[4]	100	—
Quebec & Ontario Paper Co.	Thorold, Ont.	310,000	55	Tribune Co. (100%)

Sources: Newsprint Information Committee, *Pulp & Paper Week*.
1. Includes new 230,000-tpy machine starting up in late 1991.
2. Estimated net recycled content among mill's three paper machines.
3. Includes new 215,000-tpy machine started September 1989.
4. New 136,100-tpy machine starting up mid-1990.

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MUNICIPAL SOLID WASTE AND THE PAPER INDUSTRY: THE NEXT FIVE YEARS

Muncipal collection programs are depressing the cost of old newspapers at the same time that consumers are clamoring for recycled fiber

By **FRED D. IANNAZZI** and **RICHARD STRAUSS**

The problems associated with disposal of municipal solid waste (MSW)—diminishing landfill capacity, resistance to siting new incinerator capacity, skyrocketing disposal costs—are well known to everyone in the paper industry because the paper industry is always singled out whenever a governmental authority decides that we should "do something" about MSW. The only politically acceptable method of dealing with MSW is source reduction, to be achieved principally by increased recycling. As a result of these public perceptions, a host of laws and directives intended to increase recycling of paper products has been proposed or instituted in the past year, and apparently the flood of legislation is accelerating.

The legislative approaches to reducing MSW incorporate a wide range of incentives and penalties, including targeted percent recycle fiber in specified paper products, mandated reductions in solid waste load, mandated source segregation and collection programs, tax penalty for use of nonrecyclable packaging materials, government-agency purchasing directives requiring a minimum level of recycle fiber in certain paper products, and tax incentives for wastepaper processing facilities and equipment. While some of these initiatives have repeatedly proven to be ineffective or counterproductive, for example, mandating a source segregation program for old newspapers (ONP) without finding a market for the collected product, there is no doubt the legislative activity has captured the attention of the paper industry and prompted some very useful and statesman-like actions on the part of the industry. This article reviews the current status of recycling of paper products and projects what is likely to happen to wastepaper recovery and recycling in the next five years.

Mr. Iannazzi is president, and Mr. Strauss is senior consultant, Andover International Associates, Danvers, Mass.

HOW BIG IS THE WASTEPAPER PROBLEM? The logical place to start an analysis of the present and future state of paper recycling, in the context of the MSW problem, is to present statistics on the magnitude of MSW and the relative fraction that paper products contribute to it. Unfortunately, good statistics on MSW and its composition are remarkably hard to come by. For example, the report "Facing America's Trash: What Next for Municipal Solid Waste?" produced by the U.S. Office of Technology Assessment (October 1989), cites per capita generation of MSW in selected cities ranging from 1.9 lb/day (Yakima, Wash.) to 9.4 lb/day (Chattanooga, Tenn.), a *five fold* variation. Similarly, in 49 studies of the composition of MSW, the estimated percentage of total paper in MSW ranged from 29.9% to 54.7%.

The figures most often quoted, apparently "consensus" figures, are 3.6 lb/day per capita for total MSW generation, with a paper content of 40%. Using these figures, the annual U.S. totals are then about 160 million tons of MSW, containing about 63 million tons of paper. To illustrate the uncertainty in these estimates—even if we hold the total MSW figure at 160 million tons—a difference of 30% to 50% in the paper content would pro-

TABLE 1: **Disposition of paper products in U.S. (million tons).**

Potentially recyclable paper products	U.S. consumption	Recovery for reuse and export	% recovery	Disposed in MSW
Newsprint (ONP)	13.7	4.5	33	9.2
Magazines and inserts/supplements (OMG)	6.4	Negative	Negative	6.4
Printing and writing (P & W), less OMG	17.5	8.5	49	7.0[1]
Old corrugated containers (OCC)	22.9	11.8	52	11.1
Other packaging	7.4	Negative	Negative	7.4
All other disposable paper and board[2]	11.9	Negative	Negative	11.9
Totals	**79.8**	**24.8**	**31.1**	**53.0**

1. About 2.0 disappears in permanent records.
2. Not including tissue.
Source: A.I.A.

duce a paper loading in MSW ranging from 48 million tons to 80 million tons. With much variability inherent in these numbers, it would be impractical to use them as either a basis for setting target reductions or a means for monitoring achievements of targets.

A better method of determining the paper contribution to the MSW load is to build up the figures from the statistics for the major grades of paper. Based on data from the American Paper Institute (API) and the U.S. Dept. of Commerce, Andover International Associates (AIA) has compiled the totals (Table 1). We can now examine the major grades individually and project what is likely to happen in the next five years to the quantity of each of the grades in MSW.

OLD CORRUGATED CONTAINERS (OCC). OCC, in common with some other wastepaper grades, is peculiar in that its rate of demand (consumption in medium and liner) is dependent on its rate of supply (production of corrugated containers). This cyclic situation is best illustrated by Figure 1, a format develped by AIA. Of the U.S. consumption of 22.9 million tons, 11.8 million tons (51%) were recovered for recycling or export and 11.1 million tons ended up in the MSW stream. Because some of the recovered OCC is used for products other than liner and medium and because some OCC and linerboard are exported, the recycle fiber content in U.S. corrugated containers was only about 25%, even though the recovery of OCC was 51%. Too often in discussions of possible legislative action to alleviate MSW load, the percent recycle fiber and percent recovery are considered to be synonymous.

What should be done to stimulate increased recovery of OCC? The short answer: nothing. OCC is in rather short supply at present, and we project it will become even tighter in the future. Even though the consumption of corrugated containers is expected to increase by 4.3 million tons (19%) from 1988 to 1995, the OCC load in MSW is projected to decrease by 2.3 million tons over that same period because of the forecast increase in OCC pulping capacity (Table 2). At the projected 1995 recovery rate of 68%, OCC will be in short supply indeed. Although the recovery rate will not have reached the practical limit, which we estimate to be about 75% to 80%, it will be close enough for the OCC market to be a sellers' market. There is no reason to impose incentives or penalties on OCC recovery or reuse to reduce its presence in the MSW stream. Existing market forces will do the job nicely.

ONP AND OLD MAGAZINES. On the face of it, the picture for increased recycling of ONP looks rather bleak (Figure 2). For more than ten years, the recovery rate has held at 30% to 33%, and since the newsprint industry is currently overbuilt, there seems to be no compelling reason for producers to install new deinking capacity. Moreover, despite continuing research efforts, there is no present or potential application for ONP other than newsprint that offers any significant opportunity for growth. The fallout from the MSW crisis, however, has completely changed the operating parameters of the newsprint industry. Now there is good evidence for the view that the demand for ONP will rise dramatically in the next few years so that by the end of the decade the demand will be challenging the limits of supply.

The newsprint industry has felt the impact of the MSW problem in two areas of its business:

1. New laws in Connecticut, California, and other states have set progressively increasing targets for recycle fiber in newsprint. Although the existing state laws are inconsistent and some are probably unworkable, it is clear to many newsprint producers that some set of minimum recycle fiber standards will be adopted and that it will be necessary in the future to have ONP deinking capacity in order to be able to sell newsprint.

2. The good news of the MSW crisis is that it has had, and will continue to have, a depressing effect on the cost of ONP to the newsprint producers. The disappearance of

FIGURE 1: **U.S. supply and disposal of corrugated containers.**

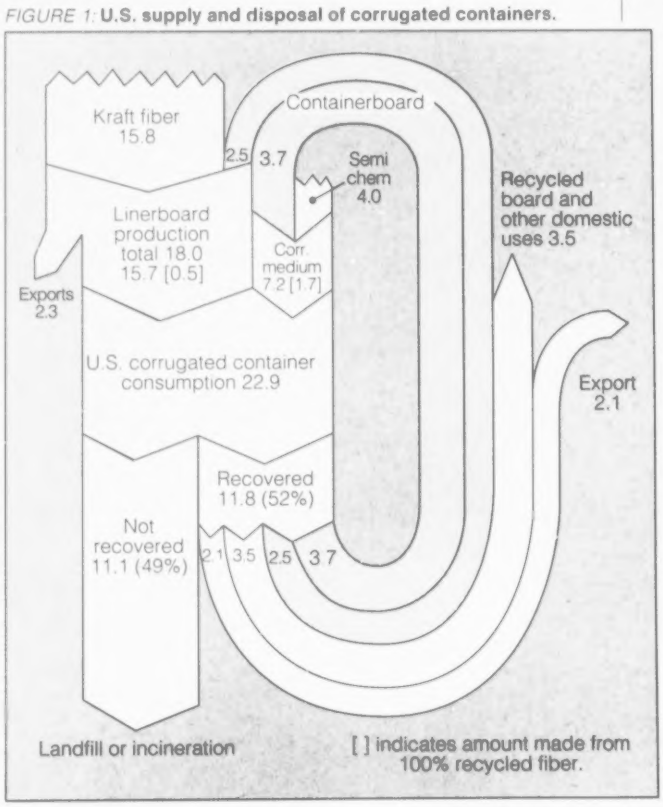


TABLE 2: **The OCC load in MSW is expected to decrease by 2.3 million tons from 1988 to 1995.**

OCC (mm tons)	U.S. consumption	Recovery for reuse and export	% recovery	Disposed in MSW
1983	18.4	8.4	46	10.0
1988	22.9	11.8	52	11.1
1995	27.2	18.4	68	8.8

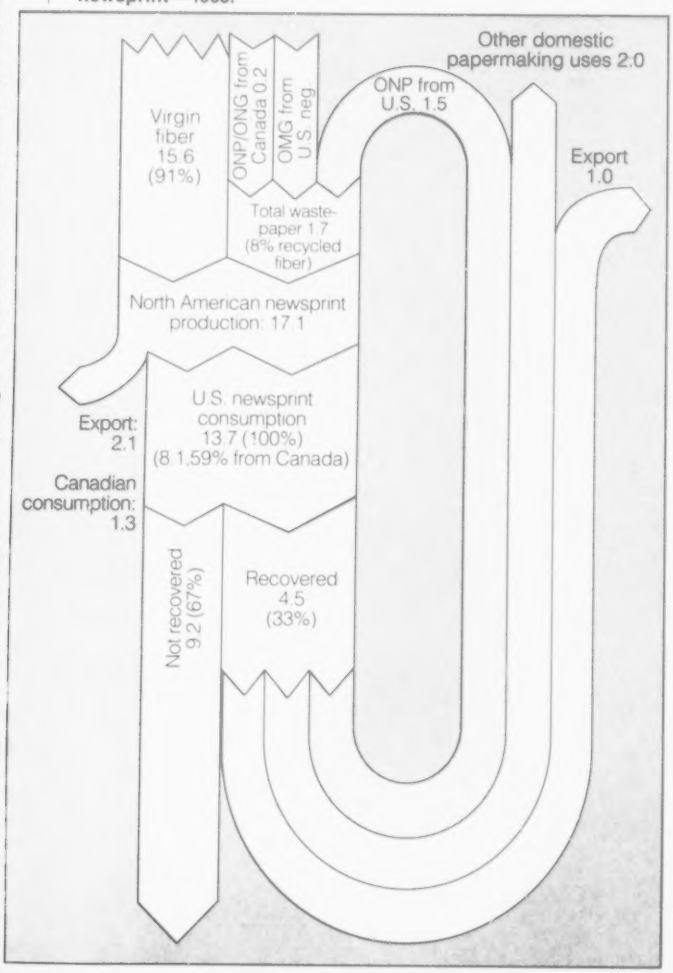
landfill capacity has driven the price of MSW disposal to an average of about $60/ton in the Northeast, and the prospect is for continued escalation of disposal costs in all areas of the country. Many municipalities have instituted segregation and curbside collection of ONP simply to avoid having to pay to dispose of it, and they are willing to pay anything less than the prevailing tipping fee to have it removed. In effect, the tipping fee (avoided cost) is subtracted from the collection/sorting/baling/transport costs (incurred costs) to arrive at the price for ONP delivered to the deinking facility. When priced on this basis, ONP becomes an economically attractive alternative to virgin pulp, in many cases even if a new deinking facility displaces an existing thermomechanical pulp facility.

To determine quantitatively what effect the new market conditions will have on ONP recovery, we must select for analysis one set of recycle fiber targets from among the many that have been legislated or proposed. We will use the recently announced New York State standards because New York standards will necessarily be influential in the industry. AIA worked with New York to assist in developing these standards. The New York standards for percent recycle fiber content in newsprint and the corresponding recovery rates calculated by AIA are shown in Table 3.

The limit on the rate of increase in recycle fiber content is the rate at which new deinking capacity can be built. Our estimate is that the deinking capacity will, in fact, be in place slightly faster than the New York schedule requires. Although at present the potential ONP supply far exceeds demand, when 65% recovery is required the demand will press the limit of practical recovery. We conclude that the mechanism is already in place to achieve the maximum possible reduction of the ONP load in MSW. What is now required is to standardize recycle fiber targets in newsprint and to maintain consistent legislative policies for the next several years.

It is interesting to note that the newer ONP deinking processes not only permit but also benefit from an admixture of about 1:2 old magazines (OMG) to ONP. By the year 2000, if the 65% recovery of ONP is achieved, about 5.5 million tons of OMG will be required in ONP deinking, over half the OMG potentially available at that time. Thus, the new conditions imposed on the ONP market will greatly reduce the OMG load in MSW.

FIGURE 2: **North American supply and disposition of newsprint—1988.**


Other domestic papermaking uses 2.0
ONP from U.S. 1.5
ONP/ONG from Canada 0.2
OMG from U.S. neg.
Virgin fiber 15.6 (91%)
Export 1.0
Total waste-paper 1.7 (8% recycled fiber)
North American newsprint production: 17.1
Export: 2.1
U.S. newsprint consumption 13.7 (100%) (8.1,59% from Canada)
Canadian consumption: 1.3
Not recovered 9.2 (67%)
Recovered 4.5 (33%)

PRINTING AND WRITING PAPER. Used printing and writing (P&W) paper, a major contributor to the MSW load, if properly segregated, is a valuable product for which ample profitable markets exist. Paradoxically, this is the one major wastepaper stream for which no organized program in hand will significantly reduce the load in MSW. Problems inhibit recovery of this potentially valuable resource:

1. In contrast with ONP, for example, the P&W paper feedstock is extremely varied in composition. The major grade classifications that comprise P&W include uncoated free-sheet, coated free-sheet, bleached bristol, coated groundwood, and uncoated groundwood. Within these major categories are many subcategories that must be monitored during storing and segregation to obtain the highest-value recycle paper.

2. For maximum utilization, the wastepaper must be collected and segregated into relatively uniform feedstocks. The paper is presently classified in three major wastepaper grades: pulp substitutes, high-grade deinking, and mixed. Within each of these major grades are multiple subdivisions recognized by the wastepaper industry. For example, API has four grades within the pulp substitutes and high-grade deinking categories, and the Paper Stock Institute of America further subdivides these four grades into 23 codes.

3. Compared with ONP and OCC, wastepaper originating from P&W grades is generated in low concentrations

TABLE 3: **New York State targets for recycle fiber content in newsprint.**

Year	N.Y. target recycle fiber content	ONP recovery rate calculated by A.I.A.
1992	11%	35%
1995	23%	43%
1997	31%	54%
2000	40%	65%

at scattered sites, many of which would be too small to justify pickup by wastepaper processors.

As a result of these multiple difficulties, the wastepaper industry has traditionally concentrated on recovery and reuse of the most accessible of the waste P&W paper: the preconsumer converter waste. This paper is usually found in high concentrations from identifiable sources and is clean and well segregated. Little postconsumer office waste is recovered at present, and postconsumer P&W household waste is essentially unrecovered.

There are now signs that the MSW crisis will begin to affect the recovery of P&W paper just as it has affected recovery of ONP. However, because of the fragmented nature of the supply, generation, and utilization of P&W paper, no single action could be taken by government or industry that would significantly increase utilization of this wastepaper. Rather, a series of actions by both government and industry will be required to alleviate the load of used P&W paper in MSW, and we believe that we will begin to see significant progress in the next few years in achieving this objective.

We see ahead developments that will lead to evolutionary—not revolutionary—progress in reducing the P&W load in MSW:

1. Much more prevalent office waste segregation programs, impelled both by the wish to avoid escalating disposal fees and the genuine desire on the part of the environmentalists (that is to say, everyone) to conserve scarce landfill capacity.

2. Implementation by municipalities and/or wastepaper dealers of systems for collecting small quantities of segregated office waste from scattered sites and concentrating them in central dropoff points.

3. Implementation by municipalities and/or wastepaper dealers of systems for collecting small quantities of segregated household fine paper waste, in conjunction with established programs for curbside collection.

4. Improved programs by wastepaper dealers to collect segregated fine paper from dropoff points, leading to more efficient and economical collection and processing of multiple grades.

5. Improved sorting and contaminant-removal processes at wastepaper handling sites.

6. Improved deinking/pulping processes that would be more tolerant of mixed feedstocks (like the newer ONP deinking process that permit high OMG content).

7. Increasing imposition of purchasing specifications by government agencies and others requiring a minimum recycle fiber content in specified products.

8. Increasing attention by government authorities and industry participants to reducing or eliminating fiber mixtures or converting additives that inhibit fiber reuse.

9. Increasing recognition by the paper industry that the market will actually favor a product with significant recycle content, even if qualities such as brightness or contaminant content are not equivalent to paper made from virgin pulp. ■

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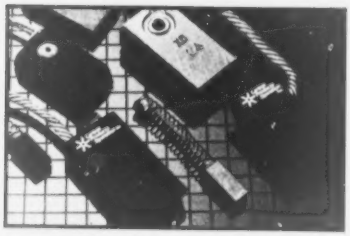

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